INSTALLATION RESTORATION PROGRAM

Site Investigation Report
Volume II

120th Fighter Interceptor Group
Montana Air National Guard
International Airport, Great Falls, Montana

February 1992

AIR NATIONAL GUARD

HAZWRAP SUPPORT CONTRACTOR OFFICE
Oak Ridge, Tennessee 37831
Operated by MARTIN MARIETTA ENERGY SYSTEMS, INC.
For the U.S. DEPARTMENT OF ENERGY under contract DE-AC05-840R21400

Site Investigation Report
Volume II
120th Fighter Interceptor Group
Montana Air National Guard
International Airport, Great Falls, Montana
February 1992

Prepared for

National Guard Bureau

Andrews Air Force Base, Maryland

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Prepared by

Engineering-Science, Inc.

Austin, Texas

Submitted by

HAZWRAP Support Contractor Office

Oak Ridge, Tennessee 37831

Operated by Martin Marietta Energy Systems, Inc.

For the U.S. Department of Energy

under contract DE-AC-5-840R21400

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ABBREVIATIONS

AGE	Aerospace ground equipment
ARARS	Applicable, relevant, and/or appropriate requirements
ATSDR	Agency for Toxic Substances and Disease Registry
bgl	Below ground level
BNA	Base neutral acid extractable semivolatile organic compounds
CAG	Carcinogen Assessment Group
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLP	Contract laboratory program
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DQO	Data quality objective
EPA	U.S. Environmental Protection Agency
ES	Engineering-Science
FS	Feasibility study
FTA	Fire training area
GC	Gas chromatograph
HNU	Trace gas analyzer
HPLC	High performance liquid chromatography
HAZWRAP	Hazardous Waste Remedial Actions Program
IRP	Installation Restoration Program
MANG	Montana Air National Guard
MCL	Maximum contaminant level
NAAQS	National ambient air quality standards
NCP	National contingency plan
NGB	National Guard Bureau
NPL	National priority list
OSHA	Occupational Safety and Health Administration
PAH	Polynuclear aromatic hydrocarbons
PCE	Perchloroethene
PRE	Preliminary risk evaluation
QA	Quality assurance
QC	Quality control
RfD	Reference dose
SAB	Science Advisory Board
SARA	Superfund Act Reauthorization Amendment
TCE	Trichloroethene
TCLP	Toxicity characteristic leaching procedure

TIC	Tentatively identified compound
TPH	Total petroleum hydrocarbons
USGS	United States Geological Survey
UST	Underground storage tank
VOC	Volatile organic compound
WQC	Water quality criteria

Appendix A

Technical Memoranda on Field Activities

MARTIN MARIETTA

ARTIN MARIETTA ENERGY SYSTEMS, INC.

POST OFFICE BOX 2003
OAK RIDGE, TENNESSEE 37831

September 21, 1990

Mr. J. David Highland
Engineering-Science, Inc.
7800 Shoal Creek Blvd.
Suite 222 West
Austin, Texas 78757

Dear David:

Montana Air National Guard, Great Falls, Montana, Site 6 Alternate Activities

This letter confirms my direction via teleconference regarding expansion of Site 6 investigative activities. We will attempt to estimate the extent of contamination associated with a leaking underground storage tank located adjacent to Building 23. Eight soil borings and related sampling/analysis will be carried out per our earlier discussion and as indicated on the attached sketch. Distances shown are approximate and will be determined in the field, based on accessibility and utility interference.

It is understood that actual field conditions and recent changes in sampling requirements, with regard to depth of borings and number of samples required, will allow alternative work to be performed at the expanded Site 6 without cost impact to the project. It is also understood that should additional monitoring wells or piezometers be required, this work will impact project cost.

During our teleconference you mentioned the possibility that our current piezometer program could produce a "false gradient" due to severe leakage of area water lines. Please investigate thoroughly and provide your recommendation in time to utilize the driller prior to his demobilization. Cost of this activity will more than likely be handled on a cost growth basis.

Should you have any further questions, please call me at 615-435-3209.

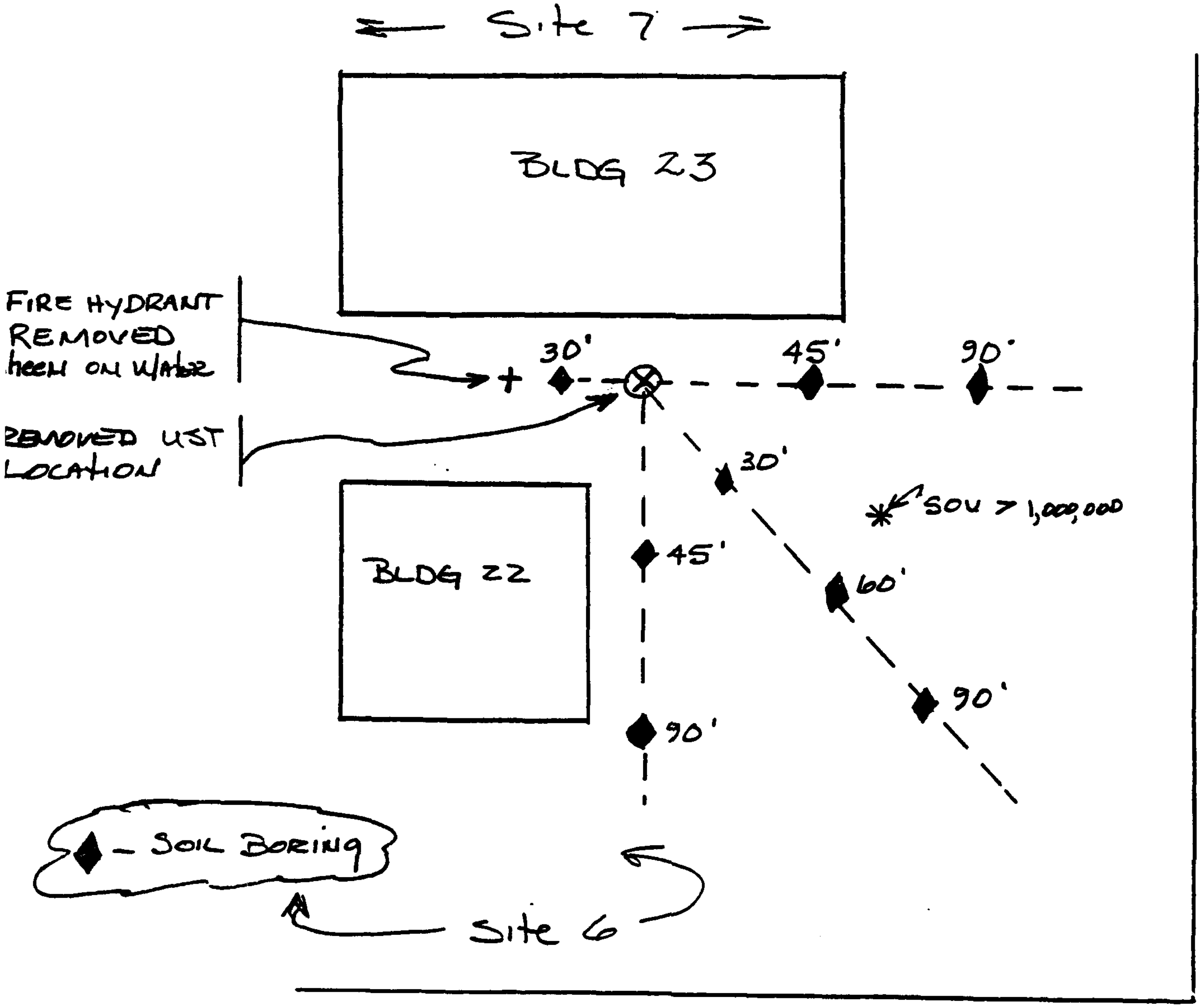
Sincerely,

TSSmith

Terry S. Smith, Project Manager
Hazardous Waste Remedial Actions Program

TSS:dmd

cc: Carol Ann Beda
Bob Combs
David Lee
File - RC



"SOIL BORINGS TO ESTIMATE EXTENT OF CONTAMINATION ASSOCIATED WITH UST REMOVED FROM REAR OF BLDG 23"

TOTAL - 8 SB's, sampling & Analysis "No Additional cost to program" —

— if MW's or Piezometers are Required Then Addional Funding is needed —

FACSIMILE TRANSMITTAL

Total Pages Including This Cover Page	Proposal or Project Number	Date
2	AU234.02	7/28/90

To: Gail Cooley

Fax phone: 615-435-3269

From: J. David Highland

ENGINEERING-SCIENCE, INC.
7800 Shoal Creek Blvd., Suite 222 West
Austin, Texas 78757
Voice: 512/467-6200
Telecopy: 512/467-7044

MESSAGE:

I have instructed the field team to proceed with change described in attached request, as per your instruction by phone this morning. Thanks. (Please see that a signed copy is returned to me for the project files)

David

Revision Date: January 1989

7. FIELD CHANGE REQUEST FORM

Field Change No. GFSI-1
Page 1 of 1

Project 120th Fighter Interceptor Group SI, Great Falls, MT

Project No. ______

Applicable Document: Work Plan, page 44 paragraph 5

Description:

Document requires ~~pla~~ ub that sand pack material be tremied during monitoring well construction. Request that sand be poured from surface, when appropriate

Reason for change:

(1) boreholes are drilled through competent sandstone. As such they stand open and can be blown clean. (2) centralizers make placement of tremie pipe difficult. (3) Pouring sand from surface would save time.

Recommended disposition:

Pour sand from surface. Assure sand pack is emplaced without bridging by calculating volume of sand required to fill the annulus and swab well as required to help sand settle.

Impact on present and completed work:

No impact on monitoring well construction quality. Pouring sand will save time and eliminate the need to pull well casing to change the orientation of centralizers.

Final Disposition:

______

______

______

Requested by:
Field/Project Manager: Vicki Burkhardt

Approvals:
HAZWRAP Project Manager: ______

ES
ENGINEERING-SCIENCE, INC.

7800 SHOAL CREEK BLVD.
SUITE 222 WEST
AUSTIN, TX 78757
Tel: (512) 467-6200 Fax: (512) 467-7044

September 28, 1990

Via facsimile

CONFIRMING COPY

Terry Smith
HAZWRAP Tri-County Office
MS 7606
P.O. Box 2003
Oak Ridge, Tennessee 37830-7606

RE: IRP, 120th FIG, Great Falls, Montana
Optional activities authorization request

Dear Terry:

Based on preliminary information from the piezometers constructed around sites 4,5,6,7, & 8, ES will need to construct two optional piezometers between the four already installed. This appears necessary because of the influence of the leaking water line near site 7 and its influence on the water levels in that area. The two additional piezometers are necessary so that ES can assess the area of influence of this long term water leak. In addition, one additional monitoring well may be needed because of the proximity of the leaking underground storage tank between sites 6 and 7. This additional well is needed to allow ES to determine the impact of this leaking tank on the groundwater data acquired during the site 6 and 7 investigations.

We will have better information as soon as development of all four piezometers is completed. However, since monitoring well installation cannot take place for these 5 sites until good groundwater gradient information is available, we feel that you need to pursue authorization for these additional activities so that down time can be minimized. We are already facing a possible two day delay before we can begin monitoring well construction at site 3. This delay is due to the need to conduct soil borings at site 3 after all other soil borings to allow the asphalt piles to be moved by the Guard. If authorization for these additional piezometers cannot be secured by the time monitoring well construction at site 3 is completed (probably next

Tuesday), we will have to discontinue monitoring well construction at that time and incur additional mobilization and demobilization charges.

We have prepared an estimate of the cost to install two additional piezometers from the cost information in our original cost proposal. The total cost, including ES personnel time and subsistence, drilling costs, and additional surveying costs is approximately $12,304.00, assuming no remobilization costs are incurred.

Sincerely,

J. David Highland

J. David Highland, P.E.
Project Manager

Enclosure

ES
ENGINEERING-SCIENCE, INC.

7800 SHOAL CREEK BLVD.
SUITE 222 WEST
AUSTIN, TX 78757
Tel: (512) 467-6200 Fax: (512) 467-7044

October 3, 1990

Bill Johnston
HAZWRAP Tri-County Office
MS 7606
P.O. Box 2003
Oak Ridge, Tennessee 37830-7606

Subject: IRP, 120th FIG, Great Falls, Montana
Optional activities authorization request

Dear Bill:

I have enclosed the technical record of project change forms for two additional piezometers and one additional monitoring well for the subject project which were originally submitted by facsimile on October 2, 1990. As we discussed, ES needs written authorization for the piezometers by Friday, October 5, to avoid delays in completion of field work. For the sake of expediency, ES is agreeable to executing these additional activities as cost growth items, even though they were included as optional activities eligible for fee in the original SI proposal. However, any other optional activities required during this project must be negotiated as out-of-scope services.

I have also enclosed field change request GFSI-2 which describes recommended changes in material used for piezometer abandonment. A response to this request is needed by October 15. As of today, I have not received written approval for the changes requested in GFSI-1 which was originally submitted to Gail Cooley. Please let me know if you have any questions or comments.

Sincerely,

J David Highland

J. David Highland, P.E.
Project Manager

enclosure

xc: Bob McLeod - ES/Oak Ridge office

TECHNICAL RECORD OF PROJECT CHANGE

1a. Project Title: Montana Air National Guard, Great Falls, Montana	
1b. Contract No.: 18B-97387C Y-06	1c. Task Order No.:
1d. SOW Date: 4/16/90	1e. Affected SOW Task: Task 2-SI

1f. Description and Justification for Change:

Piezometer data indicate significant impact to water level in area of site 7 by a long term major leak in a drinking water pipe. Two additional piezometers are needed in the central base area to estimate the area of influence of this source.

2a. Effective Start Date: 6/20/90	2b. End Date: 8/31/91

2c. Impact on Overall Project Schedule/Deliverables:
Three additional days will be required to drill, complete, and screen these two piezometers.

3. Estimated Cost Impacts:

3a. Est. Labor Hours: 60	Est. Labor Cost $ 2119
3b. Est. Persons/Trips: 2 / 1	Est. Travel Cost $ 426 (Subsistance Only)
3c. Subcontractor 1: Boland Drilling	Est. Sub 1 Cost $ 1520
3d. Subcontractor 2: Delta Engineering	Est. Sub 2 Cost $ 300
3e. ODCs: None	Est. ODC Cost $
	EST. TOTAL COST $ 4,365

4a. Requested Action:
Need immediate written authorization to proceed with construction of two additional piezometers to avoid down time.

4b. Date Needed: 10/05/90

4c. The HAZWRAP Project Manager is notified of the need for change in project cost, schedule, direction, or scope. This form does NOT satisfy Sect. 3, "Changes", of contract Terms and Conditions.

Submitted by: J. David Highland   Date: 10/02/90

5. Acknowledgement of Receipt:
HAZWRAP Project Manager (Initial Only)   Date:

6. Distribution by HAZWRAP
Energy Systems:
__ Grp Ldr __________   __ Buyer __________
__ Hydro __________   __ QA __________
__ QC __________

Sponsor:
__ Project Officer

Subcontractor:
__ Project Manager

SCO Form 108A/FEB89

TECHNICAL RECORD OF PROJECT CHANGE

1a. Project Title: Montana Air National Guard, Great Falls, Montana	
1b. Contract No.: 18B-97387C Y-06	1c. Task Order No.:
1d. SOW Date: 4/16/90	1e. Affected SOW Task: Task 2-SI

1f. Description and Justification for Change:

Leaking underground storage tank(UST) in area between site 6 and 7 may have impacted groundwater in area. Monitoring wells planned for these sites may not be suitable for delineating sources of groundwater contamination (if any). One additional monitoring well is needed immediately downgradient of the leaking UST.

2a. Effective Start Date: 6/20/90	2b. End Date: 8/31/91

2c. Impact on Overall Project Schedule/Deliverables:
Three additional days will be needed to construct, finish, develop, and sample this well.

3. Estimated Cost Impacts:

3a. Est. Labor Hours: 60	Est. Labor Cost	$ 2119
3b. Est. Persons/Trips: 2/1	Est. Travel Cost	$ 426 (Subsistance Only)
3c. Subcontractor 1: Boland Drilling	Est. Sub 1 Cost	$ 3035
3d. Subcontractor 2: Delta Engineering	Est. Sub 2 Cost	$ 300
3e. ODCs: Lab analysis, shipping	Est. ODC Cost	$ 4597
	EST. TOTAL COST	$ 10,477

4a. Requested Action:
Request written authorization to construct one additional monitoring well in the area of sites 6 & 7.

4b. Date Needed: 10/10/90

4c. The HAZWRAP Project Manager is notified of the need for change in project cost, schedule, direction, or scope. This form does NOT satisfy Sect. 3, "Changes", of contract Terms and Conditions.

Submitted by: J. David Highland Date: 10/02/90

5. Acknowledgement of Receipt:
HAZWRAP Project Manager (Initial Only) Date:

6. Distribution by HAZWRAP Energy Systems:
__ Grp Ldr ________ __ Buyer ________
__ Hydro ________ __ QA ________
__ QC ________

Sponsor:
__ Project Officer

Subcontractor:
__ Project Manager

SCO Form 108A/FEB89

Revision Date: January 1989

7. FIELD CHANGE REQUEST FORM

Field Change No. GFSI-2
Page 1 of 1

Project 120th Fighter Interceptor Group SI, Great Falls, MT

Project No.

Applicable Document: Work Plan, p. 43, paragraph 4

Description:

Piezometer abandonement: Document requires that cement grout w/bentonite be used to plug piezometer borehole. Request use of bentonite slurry instead.

Reason for change:

① Use of bentonite faster; would save 3½ days. ② Bentonite seals off fractures more effectively than cement/bentonite grout ③ Bentonite is commonly used for this purpose in this region and is approved by state of Montana

Recommended disposition:

Use slurry of pure bentonite and water (no polymers) to plug piezometer boreholes. Place slurry with tremie pipe as required by work plan.

Impact on present and completed work:

① Quality of borehole plug as good or better than if it were done with cement/bentonite grout
② Use of bentonite slurry would save 3½ days.

Final Disposition:

Requested by:
Field/Project Manager: Vicki Burkhardt

Approvals:
HAZWRAP Project Manager:

MARTIN MARIETTA

ARTIN MARIETTA ENERGY SYSTEMS, INC.

POST OFFICE BOX 2003
OAK RIDGE, TENNESSEE 37831

October 5, 1990

Mr. J. David Highland
Engineering-Science, Inc.
7800 Shoal Creek Blvd.
Suite 222 West
Austin, Texas 78757

Dear David:

Montana Air National Guard, Great Falls, Montana, Additional Activities

This letter authorizes the construction of two additional piezometers and one additional sampling well to supplement the evaluation of Sites 6 and 7. Please send me a copy of Figure 4.18 of the Work Plan indicating the proposed location of those installations. Also, show the location of the additional soil borings authorized by T. S. Smith on September 21. I recognize that this is a cost growth activity; however, there may be opportunities for cost savings as the investigation proceeds. Therefore, I prefer to defer initiation of paperwork for the cost growth to a later date when the impact of this activity on the total budget can be better defined.

If you would like to discuss this matter further, please call me at 615-435-3174.

Sincerely,

J. W. Johnston

J. W. Johnston, Jr., Project Manager
Hazardous Waste Remedial Actions Program

JWJ:dmd

cc: Carol Ann Beda-NGB
R. W. Evers
D. E. Lee
W. W. Owens
Greg Pierson-ES
File - RC

MARTIN MARIETTA

MARTIN MARIETTA ENERGY SYSTEMS, INC.

POST OFFICE BOX 2003
OAK RIDGE, TENNESSEE 37831

October 25, 1990

Mr. J. David Highland, Project Manager
Engineering-Science, Inc.
7800 Shoal Creek Blvd.
Suite 222 West
Austin, Texas 78757

Dear David:

Field Change Request GFSI-3

I agree with your recommendation (Field Change Request No. GFSI-3) that the temporary piezometers be converted to semipermanent ones to facilitate resampling next spring. The permanence of the unexpected groundwater patterns encountered during monitoring well installation must be verified to ensure that monitoring wells have been appropriately placed. It is my understanding that no impact on schedule or budget, other than the need to remeasure water levels next spring, is anticipated from this activity.

Please call me at 615-435-3174, if you have any questions.

Sincerely,

Bill Johnston

J. W. Johnston, Jr., Project Manager
Hazardous Waste Remedial Actions Program

JWJ:dmd

cc: G. L. Cooley
D. E. Lee
W. W. Owens
Greg Pierson-ES
File - RC

MARTIN MARIETTA

MARTIN MARIETTA ENERGY SYSTEMS, INC.

POST OFFICE BOX 2003
OAK RIDGE, TENNESSEE 37831

October 15, 1990

Mr. J. David Highland, Project Manager
Engineering-Science, Inc.
7800 Shoal Creek Blvd.
Suite 222 West
Austin, Texas 78757

Dear David:

Field Change Request GFSI-2

Field Change Request GFSI-2 proposes to use pure bentonite for plugging abandoned piezometer boreholes instead of the bentonite/cement grout specified in the work plan. The stated advantage of the proposed change is a 3.5-day time savings without sacrifice of quality. If you are certain that the proposed method is acceptable to the regulatory agencies that oversee this kind of activity, the use of pure bentonite instead of a bentonite/cement mixture is acceptable to me.

If you have any questions, please call me at 615-435-3174.

Sincerely,

J. W. Johnston, Jr.

J. W. Johnston, Jr., Project Manager
Hazardous Waste Remedial Actions Program

JWJ:dmd

cc: G. L. Cooley
W. W. Owens
File - RC

Appendix B

Risk Assessment Criteria

APPENDIX B

RISK ASSESSMENT CRITERIA

Criteria for use in a formal risk assessment for the sites at the 120th FIG were assembled for use in the preliminary risk evaluation. These criteria are presented in section 4 of this report. In addition, the sources for these criteria are referenced in section 4 and listed along with all of the references for this SI report.

Appendix C

Analytical Data

C.1 CLP Data Summary Tables
C.2 Laboratory Data
Investigation-Derived Materials

Table C.1 Soil Boring Analytical Program Summary

Sample ID	Depth Interval (feet)	Analyzed by		
		Field HNU	Field GC	CLP
Background:				
MANG-BG-SB1-1	0.75 - 1.50	X	X	X
MANG-BG-SB1-3.5	2.50 - 3.25	X	X	X
MANG-BG-SB2-1	0.50 - 1.25	X	X	X
MANG-BG-SB2-3	2.75 - 3.50	X	X	X
MANG-BG-SB3-1	0.75 - 1.50	X	X	X
MANG-BG-SB3-3.5	2.25 - 3.50	X	X	X
Site 1:				
MANG-1-SB1-1.5	1.25 - 1.75	X	X	
MANG-1-SB1-2	2.50 - 3.25	X	X	X
MANG-1-SB2-1	0.50 - 1.50	X	X	X
MANG-1-SB2-3	3.00 - 3.75	X	X	X
MANG-1-SB2-4	NSR			
MANG-1-SB3-1	0.75 - 1.25	X	X	X
MANG-1-SB3-3	2.50 - 3.25	X	X	X
MANG-1-SB4-1.5	1.00 - 1.75	X	X	X
MANG-1-SB0-1.5 (dup SB4-1.5)	1.00 - 1.75	X		X
MANG-1-SB5-1	0.25 - 1.00	X	X	X
MANG-1-SB5-3.5	3.00 - 3.75	X	X	X
MANG-1-SB6-1	0.75 - 1.50	X	X	X
MANG-1-SB6-3.5	2.25 - 3.00	X	X	X
MANG-1-SB7-1	0.75 - 1.50	X	X	X
MANG-1-SB8-1	0.50 - 1.25	X	X	X
MANG-1-SB9-1	1.00 - 1.75	X	X	X
MANG-1-SB9-2.5	NSR			
Site 2:				
MANG-2-SB1-1.5	0.75 - 1.75	X	X	X
MANG-2-SB1-2.5	2.25 - 3.00	X	X	
MANG-2-SB2-1.5	0.75 - 1.75	X	X	X
MANG-2-SB2-3	3.00 - 3.75	X	X	X
MANG-2-SB3-1	0.50 - 1.50	X	X	X
MANG-2-SB4-0.5	0.25 - 0.75	X	X	
MANG-2-SB4-2	1.25 - 1.75	X	X	X
MANG-2-SB5-1	0.50 - 1.00	X	X	X
MANG-2-SB5-2	1.25 - 1.75	X	X	X
MANG-2-SB6-1	0.50 - 1.00	X	X	X
MANG-2-SB6-2	1.25 - 1.75	X	X	X

NSR = no sample retained

Table C.1, continued

Sample ID	Depth Interval (feet)	Analyzed by		
		Field HNU	Field GC	CLP
Site 3:				
MANG-3-SB1-1.5	1.00 - 1.75	X	X	
MANG-3-SB1A-1.5	1.00 - 1.75	X		X
MANG-3-SB2-1	1.00 - 1.75	X	X	
MANG-3-SB2A-1.5	1.00 - 1.75	X		X
MANG-3-SB2-3.5	3.00 - 3.75	X	X	
MANG-3-SB2A-3.5	3.00 - 3.75	X		X
MANG-3-SB3-1.5	1.00 - 1.75	X	X	
MANG-3-SB3A-1	0.50 - 1.25	X		X
MANG-3-SB0-1.5	1.00 - 1.75	X	X	
MANG-3-SB0A-1 (dup SB3A-1)	0.50 - 1.25	X		X
MANG-3-SB4-1	NSR			
MANG-3-SB5-1.5	1.00 - 1.75	X	X	
MANG-3-SB5A-1.5	1.00 - 1.75	X		X
MANG-3-SB6-1	0.75 - 1.50	X	X	X
MANG-3-SB6-2.5	2.25 - 2.50	X	X	
MANG-3-SB7-1.5	0.50 - 1.25	X	X	X
MANG-3-SB8-1.5	0.25 - 1.00	X	X	X
MANG-3-SB9-1.5	0.50 - 1.25	X	X	X
MANG-3-SB9-1.5 (dup)	0.50 - 1.25	X	X	X
Site 4:				
MANG-4-SB1-1	0.25 - 1.00	X	X	X
MANG-4-SB1-1.5	1.25 - 1.75	X	X	
MANG-4-SB1-2.5	2.50 - 3.00	X	X	
MANG-4-SB1-3.5	3.25 - 3.75	X	X	
MANG-4-SB1-5.5	4.25 - 5.25	X	X	X
MANG-4-SB2-1	0.50 - 1.00	X	X	X
MANG-4-SB2-1.5	1.25 - 1.75	X	X	
MANG-4-SB2-2.5	2.25 - 2.75	X	X	
MANG-4-SB2-3.5	3.25 - 3.75	X	X	X
MANG-4-SB0-1 (dup-SB2-1)	0.50 - 1.25	X		X
MANG-4-SB0-3.5 (dup SB2-3.5)	3.00 - 3.75	X		X
MANG-4-SB3-0.5	0.50 - 1.25	X	X	
MANG-4-SB3-1.5	1.25 - 2.00	X		
MANG-4-SB3-3	2.75 - 3.50	X	X	X
MANG-4-SB3-4.5	4.25 - 5.00	X	X	
MANG-4-SB3-7	6.50 - 7.25	X	X	X
MANG-4-SB4-1.5	1.00 - 1.75	X	X	X
MANG-4-SB4-3	3.00 - 3.75	X	X	
MANG-4-SB4-5	5.00 - 5.75	X	X	
MANG-4-SB4-7	6.75 - 7.50	X	X	X
MANG-4-SB5-1.5	1.00 - 1.75	X		X
MANG-4-SB5-3.5	3.00 - 3.75	X		X
MANG-4-SB5-4.5	4.25 - 5.00	X		

NSR = no sample retained

Table C.1, continued

Sample ID	Depth Interval (feet)	Analyzed by Field HNU	Field GC	CLP
Site 5:				
MANG-5-SB1-1	0.75 - 1.25	X	X	
MANG-5-SB1-3.5	3.00 - 3.75	X	X	X
MANG-5-SB1-5	4.75 - 5.00	X	X	
MANG-5-SB1-7.5	7.00 - 7.75	X	X	X
MANG-5-SB2-1	0.75 - 1.50	X	X	X
MANG-5-SB2-3	2.75 - 3.50	X	X	
MANG-5-SB3-1.5	1.00 - 1.75	X	X	X
MANG-5-SB3-3	3.00 - 3.75	X	X	
MANG-5-SB3-5	4.50 - 5.25	X	X	X
MANG-5-SB3-6	6.00 - 6.50	X	X	
MANG-5-SB4-1.5	1.25 - 2.00	X	X	
MANG-5-SB4-3	3.00 - 3.75	X	X	
MANG-5-SB4-5.5	5.00 - 5.75	X	X	X
Site 6:				
MANG-6-SB1-1.5	1.00 - 1.75	X	X	X
MANG-6-SB1-3.5	3.00 - 3.75	X	X	X
MANG-6-SB1-5	NSR			
MANG-6-SB2-1.5	1.00 - 1.75	X	X	X
MANG-6-SB2-3	2.75 - 3.50	X	X	
MANG-6-SB2-5	5.00 - 5.25	X		
MANG-6-SB2-7	6.75 - 7.50	X	X	X
MANG-6-SB3-1	0.75 - 1.50	X	X	
MANG-6-SB3-3	2.75 - 3.50	X	X	
MANG-6-SB3-5.5	5.00 - 5.75	X	X	X
MANG-6-SB4-1	0.75 - 1.50	X	X	
MANG-6-SB4-3.5	3.00 - 3.75	X	X	
MANG-6-SB4-5	4.25 - 5.50	X	X	X
MANG-6-SB5-1	0.75 - 1.50	X	X	
MANG-6-SB5-3.5	2.00 - 2.75	X	X	X
MANG-6-SB6-1	0.50 - 1.25	X	X	
MANG-6-SB6-3.5	3.00 - 3.75	X		X

NSR = no sample retained

Table C.1, continued

Sample ID	Depth Interval (feet)	Analyzed by		
		Field HNU	Field GC	CLP
Site 7:				
MANG-7-SB1-1.5	1.25 - 2.00	X	X	X
MANG-7-SB1-3	3.00 - 3.75	X	X	
MANG-7-SB2-1	0.50 - 1.25	X	X	X
MANG-7-SB2-3	2.50 - 3.25	X	X	
MANG-7-SB3-1	1.00 - 1.75	X	X	
MANG-7-SB3-3.5	3.00 - 3.75	X	X	X
MANG-7-SB3-5.5	5.25 - 6.00	X	X	X
MANG-7-SB3-6	6.00 - 6.75	X	X	
MANG-7-SB4-1	1.00 - 1.75	X	X	
MANG-7-SB4-3	2.75 - 3.50	X	X	
MANG-7-SB4-5	4.00 - 4.75	X	X	X
Site 8:				
MANG-8-SB1-1.5	1.00 - 1.75	X	X	X
MANG-8-SB1-2.5	2.25 - 3.00	X	X	
MANG-8-SB6-1.5 (dup SB1-1.5)	1.00 - 1.75	X		X
MANG-8-SB6-2.5 (dup SB1-2.5)	2.00 - 2.75	X		
MANG-8-SB2-1	0.50 - 1.25	X	X	
MANG-8-SB2-3	2.75 - 3.50	X	X	X
MANG-8-SB2-4.5	4.25 - 5.00	X	X	
MANG-8-SB3-1	0.75 - 1.50	X	X	
MANG-8-SB3-3	2.75 - 3.50	X	X	X
MANG-8-SB3-4.5	4.00 - 4.75	X	X	
MANG-8-SB4-1.5	0.75 - 1.50	X	X	X
MANG-8-SB4-3	2.75 - 3.50	X	X	
MANG-8-SB4-5.5	4.00 - 4.75	X	X	X
MANG-8-SB5-1	1.00 - 1.75	X	X	X
MANG-8-SB5-3	2.75 - 3.50	X	X	
MANG-8-SB5-5.5	4.25 - 5.00	X	X	X

NSR = no sample retained

C.1 CLP Data Summary Tables

Definition of Data Qualifiers

Qualifiers	Definition
Organic parameters	
U	The compound was analyzed for but not detected.
J	The value reported is an estimated concentration. This is used when the compound is detected at an amount less than the reporting limit, or the compound was present at less than 5 times the value in an associated field blank.
B	The analyte is found in the associated method blank as well as in the sample.
E	This flag identifies compounds whose concentrations exceed the calibration range of the GC/MS instrument for that specific analysis.
D	This flag identifies a compound whose reported analytical result is calculated from a greater dilution than the primary analysis.
R	The data are considered invalid.
Inorganic parameters	
B	Reported value is less than reporting limit but greater than the IDL.
N	Spiked sample recovery not within control limits.
S	Reported value was determined by the Method of Standard Additions.
*	Duplicate analysis not within control limits.
W	Post digestion spike for Furnace AA analysis out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance.
+	Correlation coefficient for the MSA is less than 0.995.
E	The reported value is estimated because of the presence of interference.
R	Quality control indicates that data are not usable (compound may or may not be present). Resampling and reanalysis is necessary for verification.

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-BG-SB1(1) Concen.	Qualifier	MANG-BG-SB1(3.5) Concen.	Qualifier	MANG-BG-SB2(1) Concen.	Qualifier	MANG-BG-SB2(3) Concen.	Qualifier	MANG-BG-SB3(1) Concen.	Qualifier	MANG-BG-SB3(3.5) Concen.	Qualifier
GC/MS Volatile Organics (µg/kg)												
Chloromethane	11	U	11	U	11	U	11	U	11	U	10	U
Bromomethane	11	U	11	U	11	U	11	U	11	U	10	U
Vinyl chloride	11	U	11	U	11	U	11	U	11	U	10	U
Chloroethane	11	U	11	U	11	U	11	U	11	U	10	U
Methylene Chloride	21	UB	18	UB	10	UB	11	UB	13	UB	10	UB
Acrolein	11	U	11	U	11	U	11	U	11	U	10	U
Acetone	110	U	110	U	110	U	110	U	110	U	160	
Acrylonitrile	11	U	11	U	11	U	11	U	11	U	10	U
Carbon disulfide	11	U	11	U	11	U	11	U	11	U	10	U
Trichlorofluoromethane	11	U	11	U	11	U	11	U	11	U	10	U
1,1-Dichloroethene	5	U	5	U	5	U	6	U	5	U	5	U
1,1-Dichloroethane	5	U	5	U	5	U	6	U	5	U	5	U
trans-1,2-Dichloroethene	5	U	5	U	5	U	6	U	5	U	5	U
Chloroform	5	U	5	U	5	U	6	U	5	U	5	U
1,2-Dichloroethane	5	U	5	U	5	U	6	U	5	U	5	U
2-Butanone	110	U	110	U	110	U	110	U	110	U	100	U
1,1,1-Trichloroethane	5	U	5	U	5	U	6	U	5	U	5	U
Carbon tetrachloride	5	U	5	U	5	U	6	U	5	U	5	U
Vinyl acetate	54	U	53	U	54	U	55	U	54	U	52	U
Bromodichloromethane	5	U	5	U	5	U	6	U	5	U	5	U
1,2-Dichloropropane	5	U	5	U	5	U	6	U	5	U	5	U
cis-1,3-Dichloropropene	5	U	5	U	5	U	6	U	5	U	5	U
Trichloroethene	5	U	5	U	5	U	6	U	5	U	5	U
Benzene	5	U	5	U	5	U	6	U	5	U	5	U
Dibromochloromethane	5	U	5	U	5	U	6	U	5	U	5	U
1,1,2-Trichloroethane	5	U	5	U	5	U	6	U	5	U	5	U
trans-1,3-Dichloropropene	5	U	5	U	5	U	6	U	5	U	5	U
2-Chloroethylvinylether	11	U	11	U	11	U	11	U	11	U	10	U
Bromoform	5	U	5	U	5	U	6	U	5	U	5	U
2-Hexanone	54	U	53	U	54	U	55	U	54	U	52	U
4-Methyl-2-pentanone	54	U	53	U	54	U	55	U	54	U	52	U
Tetrachloroethene	5	U	5	U	5	U	6	U	5	U	5	U
1,1,2,2-Tetrachloroethane	5	U	5	U	5	U	6	U	5	U	5	U
Toluene	5	U	5	U	5	U	6	U	10		5	U
Chlorobenzene	5	U	5	U	5	U	6	U	5	U	5	U
Ethylbenzene	5	U	5	U	5	U	6	U	5	U	5	U
Styrene	5	U	5	U	5	U	6	U	5	U	5	U

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-BG-SB1(1) Concen.	Qualifier	MANG-BG-SB1(3.5) Concen.	Qualifier	MANG-BG-SB2(1) Concen.	Qualifier	MANG-BG-SB2(3) Concen.	Qualifier	MANG-BG-SB3(1) Concen.	Qualifier	MANG-BG-SB3(3.5) Concen.	Qualifier
m/p-xylene	5	U	5	U	5	U	6	U	5	U	5	U
o-xylene	5	U	5	U	5	U	6	U	5	U	5	U
1,3-dichlorobenzene	5	U	5	U	5	U	6	U	5	U	5	U
1,2/1,4-dichlorobenzene	5	U	5	U	5	U	6	U	5	U	5	U
GC/MS Semivolatile Organics (µg/kg)												
N-Nitroso-dimethylamine	360	U	350	U	350	U	360	U	350	U	340	U
Phenol	360	U	350	U	350	U	360	U	350	U	340	U
Bis(2-chloroethyl)ether	360	U	350	U	350	U	360	U	350	U	340	U
2-Chlorophenol	360	U	350	U	350	U	360	U	350	U	340	U
1,3-Dichlorobenzene	360	U	350	U	350	U	360	U	350	U	340	U
1,4-Dichlorobenzene	360	U	350	U	350	U	360	U	350	U	340	U
Benzylalcohol	360	U	350	U	350	U	360	U	350	U	340	U
1,2-Dichlorobenzene	360	U	350	U	350	U	360	U	350	U	340	U
2-Methylphenol	360	U	350	U	350	U	360	U	350	U	340	U
Bis(2-chloroisopropyl)ether	360	U	350	U	350	U	360	U	350	U	340	U
4-Methylphenol	360	U	350	U	350	U	360	U	350	U	340	U
N-Nitroso-di-n-propylamine	360	U	350	U	350	U	360	U	350	U	340	U
Hexachloroethane	360	U	350	U	350	U	360	U	350	U	340	U
Nitrobenzene	360	U	350	U	350	U	360	U	350	U	340	U
Isophorone	360	U	350	U	350	U	360	U	350	U	340	U
2-Nitrophenol	360	U	350	U	350	U	360	U	350	U	340	U
2,4-Dimethylphenol	360	U	350	U	350	U	360	U	350	U	340	U
Bis(2-chloroethoxy)methane	360	U	350	U	350	U	360	U	350	U	340	U
2,4-Dichlorophenol	360	U	350	U	350	U	360	U	350	U	340	U
Benzoic acid	1700	U	1700	U	1700	U	1800	U	1700	U	1700	U
1,2,4-Trichlorobenzene	360	U	350	U	350	U	360	U	350	U	340	U
Naphthalene	360	U	350	U	350	U	360	U	350	U	340	U
4-Chloroaniline	360	U	350	U	350	U	360	U	350	U	340	U
Hexachlorobutadiene	360	U	350	U	350	U	360	U	350	U	340	U
4-Chloro-3-methylphenol	360	U	350	U	350	U	360	U	350	U	340	U
2-Methylnaphthalene	360	U	350	U	350	U	360	U	350	U	340	U
Hexachlorocyclopentadiene	360	U	350	U	350	U	360	U	350	U	340	U
2,4,6-Trichlorophenol	360	U	350	U	350	U	360	U	350	U	340	U
2,4,5-Trichlorophenol	1700	U	1700	U	1700	U	1800	U	1700	U	1700	U
2-Chloronaphthalene	360	U	350	U	350	U	360	U	350	U	340	U
2-Nitroaniline	360	U	350	U	350	U	360	U	350	U	340	U
Dimethylphthalate	360	U	350	U	350	U	360	U	350	U	340	U

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-BG-SB1(1) Concen.	Qualifier	MANG-BG-SB1(3.5) Concen.	Qualifier	MANG-BG-SB2(1) Concen.	Qualifier	MANG-BG-SB2(3) Concen.	Qualifier	MANG-BG-SB3(1) Concen.	Qualifier	MANG-BG-SB3(3.5) Concen.	Qualifier
Acenaphthylene	360	U	350	U	350	U	360	U	350	U	340	U
2,6-Dinitrotoluene	360	U	350	U	350	U	360	U	350	U	340	U
3-Nitroaniline	1700	U	1700	U	1700	U	1800	U	1700	U	1700	U
Acenaphthene	360	U	350	U	350	U	360	U	350	U	340	U
2,4-Dinitrophenol	1700	U	1700	U	1700	U	1800	U	1700	U	1700	U
Dibenzofuran	360	U	350	U	350	U	360	U	350	U	340	U
4-Nitrophenol	1700	U	1700	U	1700	U	1800	U	1700	U	1700	U
2,4-Dinitrotoluene	360	U	350	U	350	U	360	U	350	U	340	U
Fluorene	360	U	350	U	350	U	360	U	350	U	340	U
Diethylphthalate	360	U	350	U	350	U	360	U	350	U	340	U
4-Chlorophenylphenylether	360	U	350	U	350	U	360	U	350	U	340	U
4-Nitroaniline	1700	U	1700	U	1700	U	1800	U	1700	U	1700	U
4,6-Dinitro-2-methylphenol	1700	U	1700	U	1700	U	1800	U	1700	U	1700	U
N-Nitrosodiphenylamine	360	U	350	U	350	U	360	U	350	U	340	U
4-Bromophenylphenylether	360	U	350	U	350	U	360	U	350	U	340	U
Hexachlorobenzene	360	U	350	U	350	U	360	U	350	U	340	U
Pentachlorophenol	1700	U	1700	U	1700	U	1800	U	1700	U	1700	U
Phenanthrene	360	U	350	U	350	U	360	U	350	U	340	U
Anthracene	360	U	350	U	350	U	360	U	350	U	340	U
Di-n-butylphthalate	360	U	350	U	350	U	360	U	350	U	340	U
Fluoranthene	360	U	350	U	350	U	360	U	350	U	340	U
Pyrene	360	U	350	U	350	U	360	U	350	U	340	U
Butylbenzylphthalate	360	U	350	U	350	U	360	U	350	U	340	U
Benzo(a)anthracene	360	U	350	U	350	U	360	U	350	U	340	U
3,3'-Dichlorobenzidine	720	U	700	U	710	U	730	U	710	U	690	U
Chrysene	360	U	350	U	350	U	360	U	350	U	340	U
Bis(2-ethylhexyl)phthalate	360	U	350	U	350	U	360	U	350	U	150	J
Di-n-octylphthalate	360	U	350	U	350	U	360	U	350	U	340	U
Benzo(b)fluoranthene	360	U	350	U	350	U	360	U	350	U	340	U
Benzo(k)fluoranthene	360	U	350	U	350	U	360	U	350	U	340	U
Benzo(a)pyrene	360	U	350	U	350	U	360	U	350	U	340	U
Indeno(1,2,3-cd)pyrene	360	U	350	U	350	U	360	U	350	U	340	U
Dibenzo(a,h)anthracene	360	U	350	U	350	U	360	U	350	U	340	U
Benzo(g,h,i)perylene	360	U	350	U	350	U	360	U	350	U	340	U
Metals (mg/kg)												
Arsenic	5.2		9.6		6.1		4.3		4.3		6.1	
Barium	219		971		101		206		171		919	

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-BG-SB1(1) Concen.	Qualifier	MANG-BG-SB1(3.5) Concen.	Qualifier	MANG-BG-SB2(1) Concen.	Qualifier	MANG-BG-SB2(3) Concen.	Qualifier	MANG-BG-SB3(1) Concen.	Qualifier	MANG-BG-SB3(3.5) Concen.	Qualifier
Cadmium	0.39	U	0.4	U	0.37	U	0.4	U	0.38	U	0.33	U
Chromium	13.3		14.4		13.3		20.7		19.6		12.9	
Copper	10.8	*	18.6	*	6.9	*	12.8	*	11.1	*	8.5	*
Lead	8.2		8.7		5.5	B	12.2		8.3		6	
Mercury	0.045	UN	0.051	UN	0.047	UN	0.048	UN	0.045	UN	0.043	UN
Nickel	10		14.4		6.4	B	14.8		10.5		7.4	
Selenium	0.37	BW	0.29	UW	0.32	U	0.32	BW	0.43	BW	0.42	BW
Silver	1.6	U	1.6	U	1.5	U	1.6	U	1.5	U	1.3	U
Zinc	34.3	*	54.7	*	33.3	*	48	*	47.4	*	30.4	*
Total Petroleum Hydrocarbons (mg/kg)	ND		ND		ND		ND		ND		ND	

Analytical Data Summary
Soil Samples, Site 1
Great Falls SI

Analysis	MANG-1-SB1(2) Concen.	MANG-1-SB1(2) Qualifier	MANG-1-SB2(1) Concen.	MANG-1-SB2(1) Qualifier	MANG-1-SB2(3) Concen.	MANG-1-SB2(3) Qualifier	MANG-1-SB3(1) Concen.	MANG-1-SB3(1) Qualifier	MANG-1-SB3(3) Concen.	MANG-1-SB3(3) Qualifier	MANG-1-SB4(1.5) Concen.	MANG-1-SB4(1.5) Qualifier	MANG-1-SB4(1.5)-D Concen.	MANG-1-SB4(1.5)-D Qualifier	MANG-1-SB5(1) Concen.	MANG-1-SB5(1) Qualifier	MANG-1-SB5(3.5) Concen.	MANG-1-SB5(3.5) Qualifier
GC/MS Volatile Organics (µg/kg)																		
Chloromethane	11	U	11	U	11	U	11	U	11	U	12	U	11	U	11	U	10	U
Bromomethane	11	U	11	U	11	U	11	U	11	U	12	U	11	U	11	U	10	U
Vinyl chloride	11	U	11	U	11	U	11	U	11	U	12	U	11	U	11	U	10	U
Chloroethane	11	U	11	U	11	U	11	U	11	U	12	U	11	U	11	U	10	U
Methylene Chloride	19	UB	17	UB	12	UB	12	UB	13	UB	21	UB	16	UB	13	UB	14	UB
Acrolein	11	U	11	U	11	U	11	U	11	U	12	U	11	U	11	U	10	U
Acetone	110	U	110	U	15	J	110	U	90	J	120	U	110	U	110	U	22	J
Acrylonitrile	11	U	11	U	11	U	11	U	11	U	12	U	11	U	11	U	10	U
Carbon disulfide	11	U	11	U	11	U	11	U	11	U	12	U	11	U	11	U	10	U
Trichlorofluoromethane	11	U	11	U	11	U	11	U	11	U	12	U	11	U	11	U	10	U
1,1-Dichloroethene	5	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
1,1-Dichloroethane	5	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
trans-1,2-Dichloroethene	5	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
Chloroform	5	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
1,2-Dichloroethane	5	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
2-Butanone	110	U	110	U	110	U	110	U	14	J	120	U	110	U	110	U	100	U
1,1,1-Trichloroethane	5	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
Carbon tetrachloride	5	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
Vinyl acetate	53	U	54	U	54	U	54	U	54	U	60	U	56	U	55	U	52	U
Bromodichloromethane	5	U	5	U	5	U	5	U	5	U	60	U	6	U	6	U	5	U
1,2-Dichloropropane	5	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
cis-1,3-Dichloropropene	5	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
Trichloroethene	5	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
Benzene	5	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
Dibromochloromethane	5	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
1,1,2-Trichloroethane	5	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
trans-1,3-Dichloropropene	5	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
2-Chloroethylvinylether	11	U	11	U	11	U	11	U	11	U	12	U	11	U	11	U	10	U
Bromoform	5	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
2-Hexanone	53	U	54	U	54	U	54	U	54	U	60	U	56	U	55	U	52	U
4-Methyl-2-pentanone	53	U	54	U	54	U	54	U	54	U	60	U	56	U	55	U	52	U
Tetrachloroethene	5	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
1,1,2,2-Tetrachloroethane	5	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
Toluene	5	U	5	U	5	U	5	U	92		6	U	6	U	6	U	5	U
Chlorobenzene	5	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
Ethylbenzene	5	U	5	U	5	U	5	U	16		6	U	6	U	6	U	5	U
Styrene	5	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U

Analytical Data Summary
Soil Samples, Site 1
Great Falls SI

Analysis	MANG-1-SB1(2) Concen.	Qualifier	MANG-1-SB2(1) Concen.	Qualifier	MANG-1-SB2(3) Concen.	Qualifier	MANG-1-SB3(1) Concen.	Qualifier	MANG-1-SB3(3) Concen.	Qualifier	MANG-1-SB4(1.5) Concen.	Qualifier	MANG-1-SB4(1.5)-D Concen.	Qualifier	MANG-1-SB5(1) Concen.	Qualifier	MANG-1-SB5(3.5) Concen.	Qualifier
m/p-xylene	5	U	5	U	5	U	5	U	54		6	U	6	U	6	U	5	U
o-xylene	5	U	5	U	5	U	5	U	40		6	U	6	U	6	U	5	U
1,3-dichlorobenzene	5	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
1,2/1,4-dichlorobenzene	5	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
GC/MS Semivolatile Organics (µg/kg)																		
N-Nitroso-dimethylamine	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Phenol	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Bis(2-chloroethyl)ether	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
2-Chlorophenol	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
1,3-Dichlorobenzene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
1,4-Dichlorobenzene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Benzylalcohol	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
1,2-Dichlorobenzene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
2-Methylphenol	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Bis(2-chloroisopropyl)ether	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
4-Methylphenol	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
N-Nitroso-di-n-propylamine	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Hexachloroethane	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Nitrobenzene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Isophorone	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
2-Nitrophenol	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
2,4-Dimethylphenol	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Bis(2-chloroethoxy)methane	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
2,4-Dichlorophenol	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Benzoic acid	1700	U	1700	U	1700	U	1700	U	1700	U	1900	U	1800	U	1800	U	1700	U
1,2,4-Trichlorobenzene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Naphthalene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
4-Chloroaniline	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Hexachlorobutadiene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
4-Chloro-3-methylphenol	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
2-Methylnaphthalene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Hexachlorocyclopentadiene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
2,4,6-Trichlorophenol	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
2,4,5-Trichlorophenol	1700	U	1700	U	1700	U	1700	U	1700	U	1900	U	1800	U	1800	U	1700	U
2-Chloronaphthalene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
2-Nitroaniline	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Dimethylphthalate	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U

Analytical Data Summary
Soil Samples, Site 1
Great Falls SI

Analysis	MANG-1-SB1(2) Concen.	MANG-1-SB1(2) Qualifier	MANG-1-SB2(1) Concen.	MANG-1-SB2(1) Qualifier	MANG-1-SB2(3) Concen.	MANG-1-SB2(3) Qualifier	MANG-1-SB3(1) Concen.	MANG-1-SB3(1) Qualifier	MANG-1-SB3(3) Concen.	MANG-1-SB3(3) Qualifier	MANG-1-SB4(1.5) Concen.	MANG-1-SB4(1.5) Qualifier	MANG-1-SB4(1.5)-D Concen.	MANG-1-SB4(1.5)-D Qualifier	MANG-1-SB5(1) Concen.	MANG-1-SB5(1) Qualifier	MANG-1-SB5(3.5) Concen.	MANG-1-SB5(3.5) Qualifier
Acenaphthylene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
2,6-Dinitrotoluene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
3-Nitroaniline	1700	U	1700	U	1700	U	1700	U	1700	U	1900	U	1800	U	1800	U	1700	U
Acenaphthene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
2,4-Dinitrophenol	1700	U	1700	U	1700	U	1700	U	1700	U	1900	U	1800	U	1800	U	1700	U
Dibenzofuran	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
4-Nitrophenol	1700	U	1700	U	1700	U	1700	U	1700	U	1900	U	1800	U	1800	U	1700	U
2,4-Dinitrotoluene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Fluorene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Diethylphthalate	350	U	270	J	360	U	350	U	1600		390	U	150	J	120	J	340	U
4-Chlorophenylphenylether	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
4-Nitroaniline	1700	U	1700	U	1700	U	1700	U	1700	U	1900	U	1800	U	1800	U	1700	U
4,6-Dinitro-2-methylphenol	1700	U	1700	U	1700	U	1700	U	1700	U	1900	U	1800	U	1800	U	1700	U
N-Nitrosodiphenylamine	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
4-Bromophenylphenylether	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Hexachlorobenzene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Pentachlorophenol	1700	U	1700	U	1700	U	1700	U	1700	U	1900	U	1800	U	1800	U	1700	U
Phenanthrene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Anthracene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Di-n-butylphthalate	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Fluoranthene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Pyrene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Butylbenzylphthalate	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Benzo(a)anthracene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
3,3'-Dichlorobenzidine	690	U	710	U	720	U	710	U	720	U	790	U	780	U	780	U	690	U
Chrysene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Bis(2-ethylhexyl)phthalate	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Di-n-octylphthalate	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Benzo(b)fluoranthene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Benzo(k)fluoranthene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Benzo(a)pyrene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Indeno(1,2,3-cd)pyrene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Dibenzo(a,h)anthracene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Benzo(g,h,i)perylene	350	U	350	U	360	U	350	U	360	U	390	U	360	U	360	U	340	U
Metals (mg/kg)																		
Arsenic	13.6		3.8		9.5		11.2		8.6		8.4		8.4		6.2		6.2	S
Barium	714	N	127	N	352	N	133	N	382	N	252	N	763	N	217	N	548	N

Analytical Data Summary
Soil Samples, Site 1
Great Falls SI

Analysis	MANG-1-SB1(2)		MANG-1-SB2(1)		MANG-1-SB2(3)		MANG-1-SB3(1)		MANG-1-SB3(3)		MANG-1-SB4(1.5)		MANG-1-SB4(1.5)-D		MANG-1-SB5(1)		MANG-1-SB5(3.5)	
	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier
Cadmium	0.4	B	0.4	U	0.36	U	0.43	U	0.38	U	0.47	U	0.41	U	0.44	U	0.4	U
Chromium	10.2	*	13.8	*	9.2	*	15.2	*	9.8	*	17.7	*	5.9	*	15.5	*	10.3	*
Copper	22.3		8.8		15.3		20.5		18.1		15.8		13.4		15.9		14	
Lead	7	N*	13.3	N*S	8	N*	18.1	N*	3.3	N*	16.6	N*S	11.4	N*S	14.9	N*S	7.7	N*S
Mercury	0.044	U	0.049	U	0.049	U	0.049	U	0.054	U	0.05	U	0.053	U	0.16		0.047	U
Nickel	6.8	U	8.2		8.6		7.5	B	7.9		17.7		6.9	U	10.7		7.1	B
Selenium	0.45		0.32	U	0.27	U	0.31	U	0.32	UW	0.32	U	0.38	BW	0.28	UW	0.26	U
Silver	1.6	U	1.6	U	1.5	U	1.7	U	1.6	U	1.9	U	1.7	U	1.8	U	1.6	U
Zinc	41.4		39.5		31.8		62.9		21.9		51.9		23.5		43.4		26.1	
Total Petroleum Hydrocarbons (mg/kg)	10		ND		ND		25		ND		ND		ND		ND		ND	

Analytical Data Summary
Soil Samples, Site 1
Great Falls SI

Analysis	MANG-1-SB6(1) Concen.	Qualifier	MANG-1-SB6(3.5) Concen.	Qualifier	MANG-1-SB7(1) Concen.	Qualifier	MANG-1-SB8(1) Concen.	Qualifier	MANG-1-SB9(1) Concen.	Qualifier
GC/MS Volatile Organics (μg/kg)										
Chloromethane	11	U	11	U	5700	U	11	U	11	U
Bromomethane	11	U	11	U	5700	U	11	U	11	U
Vinyl chloride	11	U	11	U	5700	U	11	U	11	U
Chloroethane	11	U	11	U	5700	U	11	U	11	U
Methylene Chloride	13	UB	9	UB	5500	UB	8	UB	8	UB
Acrolein	11	U	11	U	5700	U	11	U	11	U
Acetone	220		22	J	57000	U	110	J	110	J
Acrylonitrile	11	U	11	U	5700	U	11	U	11	U
Carbon disulfide	11	U	11	U	5700	U	11	U	11	U
Trichlorofluoromethane	11	U	11	U	5700	U	11	U	11	U
1,1-Dichloroethene	6	U	5	U	2800	U	6	U	5	U
1,1-Dichloroethane	6	U	5	U	2800	U	6	U	5	U
trans-1,2-Dichloroethene	6	U	5	U	2800	U	6	U	5	U
Chloroform	6	U	5	U	2800	U	6	U	5	U
1,2-Dichloroethane	6	U	5	U	2800	U	6	U	5	U
2-Butanone	110	U	110	U	57000	U	110	U	110	U
1,1,1-Trichloroethane	6	U	5	U	2800	U	6	U	5	U
Carbon tetrachloride	6	U	5	U	2800	U	6	U	5	U
Vinyl acetate	56	U	53	U	28000	U	57	U	54	U
Bromodichloromethane	6	U	5	U	2800	U	6	U	5	U
1,2-Dichloropropane	6	U	5	U	2800	U	6	U	5	U
cis-1,3-Dichloropropene	6	U	5	U	2800	U	6	U	5	U
Trichloroethene	6	U	5	U	2800	U	6	U	5	U
Benzene	6	U	5	U	2800	U	6	U	5	U
Dibromochloromethane	6	U	5	U	2800	U	6	U	5	U
1,1,2-Trichloroethane	6	U	5	U	2800	U	6	U	5	U
trans-1,3-Dichloropropene	6	U	5	U	2800	U	6	U	5	U
2-Chloroethylvinylether	11	U	11	U	5700	U	11	U	11	U
Bromoform	6	U	5	U	2800	U	6	U	5	U
2-Hexanone	56	U	53	U	28000	U	57	U	54	U
4-Methyl-2-pentanone	56	U	53	U	28000	U	57	U	54	U
Tetrachloroethene	6	U	5	U	2800	U	6	U	5	U
1,1,2,2-Tetrachloroethane	6	U	5	U	2800	U	6	U	5	U
Toluene	6	U	5	U	8800		6	U	5	U
Chlorobenzene	6	U	5	U	2800	U	6	U	5	U
Ethylbenzene	6	U	5	U	22000		6	U	5	U
Styrene	6	U	5	U	2800	U	6	U	5	U

Analytical Data Summary
Soil Samples, Site 1
Great Falls SI

Analysis	MANG-1-SB6(1) Concen.	Qualifier	MANG-1-SB6(3.5) Concen.	Qualifier	MANG-1-SB7(1) Concen.	Qualifier	MANG-1-SB8(1) Concen.	Qualifier	MANG-1-SB9(1) Concen.	Qualifier
m/p-xylene	6	U	5	U	150000		6	U	5	U
o-xylene	6	U	5	U	77000		6	U	5	U
1,3-dichlorobenzene	6	U	5	U	2800	U	6	U	5	U
1,2/1,4-dichlorobenzene	6	U	5	U	2800	U	6	U	5	U
GC/MS Semivolatile Organics (μg/kg)										
N-Nitroso-dimethylamine	370	U	350	U	7500	U	380	U	350	U
Phenol	370	U	350	U	7500	U	380	U	350	U
Bis(2-chloroethyl)ether	370	U	350	U	7500	U	380	U	350	U
2-Chlorophenol	370	U	350	U	7500	U	380	U	350	U
1,3-Dichlorobenzene	370	U	350	U	7500	U	380	U	350	U
1,4-Dichlorobenzene	370	U	350	U	7500	U	380	U	350	U
Benzylalcohol	370	U	350	U	7500	U	380	U	350	U
1,2-Dichlorobenzene	370	U	350	U	7500	U	380	U	350	U
2-Methylphenol	370	U	350	U	7500	U	380	U	350	U
Bis(2-chloroisopropyl)ether	370	U	350	U	7500	U	380	U	350	U
4-Methylphenol	370	U	350	U	7500	U	380	U	350	U
N-Nitroso-di-n-propylamine	370	U	350	U	7500	U	380	U	350	U
Hexachloroethane	370	U	350	U	7500	U	380	U	350	U
Nitrobenzene	370	U	350	U	7500	U	380	U	350	U
Isophorone	370	U	350	U	7500	U	380	U	350	U
2-Nitrophenol	370	U	350	U	7500	U	380	U	350	U
2,4-Dimethylphenol	370	U	350	U	7500	U	380	U	350	U
Bis(2-chloroethoxy)methane	370	U	350	U	7500	U	380	U	350	U
2,4-Dichlorophenol	370	U	350	U	7500	U	380	U	350	U
Benzoic acid	1800	U	1700	U	36000	U	1800	U	1700	U
1,2,4-Trichlorobenzene	370	U	350	U	7500	U	380	U	350	U
Naphthalene	370	U	350	U	7500	U	380	U	350	U
4-Chloroaniline	370	U	350	U	7500	U	380	U	350	U
Hexachlorobutadiene	370	U	350	U	7500	U	380	U	350	U
4-Chloro-3-methylphenol	370	U	350	U	7500	U	380	U	350	U
2-Methylnaphthalene	370	U	350	U	13000		380	U	350	U
Hexachlorocyclopentadiene	370	U	350	U	7500	U	380	U	350	U
2,4,6-Trichlorophenol	370	U	350	U	7500	U	380	U	350	U
2,4,5-Trichlorophenol	1800	U	1700	U	36000	U	1800	U	1700	U
2-Chloronaphthalene	370	U	350	U	7500	U	380	U	350	U
2-Nitroaniline	370	U	350	U	7500	U	380	U	350	U
Dimethylphthalate	370	U	350	U	7500	U	380	U	350	U

Analytical Data Summary
Soil Samples, Site 1
Great Falls SI

Analysis	MANG-1-SB6(1) Concen.	MANG-1-SB6(1) Qualifier	MANG-1-SB6(3.5) Concen.	MANG-1-SB6(3.5) Qualifier	MANG-1-SB7(1) Concen.	MANG-1-SB7(1) Qualifier	MANG-1-SB8(1) Concen.	MANG-1-SB8(1) Qualifier	MANG-1-SB9(1) Concen.	MANG-1-SB9(1) Qualifier
Acenaphthylene	370	U	350	U	7500	U	380	U	350	U
2,6-Dinitrotoluene	370	U	350	U	7500	U	380	U	350	U
3-Nitroaniline	1800	U	1700	U	36000	U	1800	U	1700	U
Acenaphthene	370	U	350	U	7500	U	380	U	350	U
2,4-Dinitrophenol	1800	U	1700	U	36000	U	1800	U	1700	U
Dibenzofuran	370	U	350	U	7500	U	380	U	350	U
4-Nitrophenol	1800	U	1700	U	36000	U	1800	U	1700	U
2,4-Dinitrotoluene	370	U	350	U	7500	U	380	U	350	U
Fluorene	370	U	350	U	7500	U	380	U	350	U
Diethylphthalate	370	U	350	U	7500	U	380	U	350	U
4-Chlorophenylphenylether	370	U	350	U	7500	U	380	U	350	U
4-Nitroaniline	1800	U	1700	U	36000	U	1800	U	1700	U
4,6-Dinitro-2-methylphenol	1800	U	1700	U	36000	U	1800	U	1700	U
N-Nitrosodiphenylamine	370	U	350	U	7500	U	380	U	350	U
4-Bromophenylphenylether	370	U	350	U	7500	U	380	U	350	U
Hexachlorobenzene	370	U	350	U	7500	U	380	U	350	U
Pentachlorophenol	1800	U	1700	U	36000	U	1800	U	1700	U
Phenanthrene	370	U	350	U	9500		380	U	350	U
Anthracene	370	U	350	U	7500	U	380	U	350	U
Di-n-butylphthalate	370	U	350	U	7500	U	380	U	350	U
Fluoranthene	370	U	350	U	4900	J	380	U	350	U
Pyrene	370	U	350	U	14000		380	U	350	U
Butylbenzylphthalate	370	U	350	U	7500	U	380	U	350	U
Benzo(a)anthracene	370	U	350	U	7500	U	380	U	350	U
3,3'-Dichlorobenzidine	740	U	690	U	15000	U	750	U	710	U
Chrysene	370	U	350	U	7500	U	380	U	350	U
Bis(2-ethylhexyl)phthalate	370	U	350	U	7500	U	380	U	350	U
Di-n-octylphthalate	370	U	350	U	7500	U	380	U	350	U
Benzo(b)fluoranthene	370	U	350	U	7500	U	380	U	350	U
Benzo(k)fluoranthene	370	U	350	U	7500	U	380	U	350	U
Benzo(a)pyrene	370	U	350	U	7500	U	380	U	350	U
Indeno(1,2,3-cd)pyrene	370	U	350	U	7500	U	380	U	350	U
Dibenzo(a,h)anthracene	370	U	350	U	7500	U	380	U	350	U
Benzo(g,h,i)perylene	370	U	350	U	7500	U	380	U	350	U
Metals (mg/kg)										
Arsenic	10		13.3		6.3		8.7		17.7	B
Barium	279	N	315	N	197	N	244	N	136	N

Analytical Data Summary
Soil Samples, Site 1
Great Falls SI

Analysis	MANG-1-SB6(1)		MANG-1-SB6(3.5)		MANG-1-SB7(1)		MANG-1-SB8(1)		MANG-1-SB9(1)	
	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier
Cadmium	0.36	U	0.4	U	0.45	U	0.41	U	0.42	U
Chromium	19.5	*	9.6	*	16.8	*	17.4	*	14.9	*
Copper	20.4		13.7		8.5		13.7		20.4	
Lead	11.7	N*	4	N*	139	N*	17	N*S	11.2	N*S
Mercury	0.051	U	0.053	U	0.054	U	0.047	U	0.049	U
Nickel	15.5		6.9	U	10.1		10.6		7.3	U
Selenium	0.29	U	0.42	B	0.33	UW	0.36	BW	0.35	B
Silver	1.5	U	1.6	U	1.8	U	1.7	U	1.7	U
Zinc	46.5		23.5		54.7		43.5		42.7	
Total Petroleum Hydrocarbons (mg/kg)	ND		ND		120000		ND		ND	

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-2-SB1(1.5)		MANG-2-SB2(1.5)		MANG-2-SB2(3)		MANG-2-SB3(1)		MANG-2-SB4(2)		MANG-2-SB5(1)		MANG-2-SB5(2)		MANG-2-SB6(1)		MANG-2-SB6(2)		MANG-2-SED1	
	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier
GC/MS Volatile Organics (μg/kg)																				
Chloromethane	12	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U	10	UR
Bromomethane	12	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U	10	UR
Vinyl chloride	12	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U	10	UR
Chloroethane	12	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U	10	UR
Methylene Chloride	27	UB	22	UB	24	UB	18	UB	19	UB	17	UB	19	UB	27	UB	19	UB	18	UBR
Acrolein	12	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U	10	UR
Acetone	120	J	72	J	110	U	110	U	170		19	J	110	U	110	U	110	U	100	UR
Acrylonitrile	12	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U	10	UR
Carbon disulfide	12	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U	10	UR
Trichlorofluoromethane	12	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U	10	UR
1,1-Dichloroethene	6	U	5	U	6	U	6	U	6	U	6	U	6	U	5	U	5	U	5	UR
1,1-Dichloroethane	6	U	5	U	6	U	6	U	6	U	6	U	6	U	5	U	5	U	5	UR
trans-1,2-Dichloroethene	6	U	5	U	6	U	6	U	6	U	6	U	6	U	5	U	5	U	5	UR
Chloroform	6	U	5	U	6	U	6	U	6	U	6	U	6	U	5	U	5	U	5	UR
1,2-Dichloroethane	6	U	5	U	6	U	6	U	6	U	6	U	6	U	5	U	5	U	5	UR
2-Butanone	120	U	110	U	110	U	110	U	110	U	110	U	110	U	110	U	110	U	100	UR
1,1,1-Trichloroethane	6	U	5	U	6	U	6	U	6	U	6	U	6	U	5	U	5	U	5	UR
Carbon tetrachloride	6	U	5	U	6	U	6	U	6	U	6	U	6	U	5	U	5	U	5	UR
Vinyl acetate	58	U	53	U	55	U	55	U	55	U	55	U	55	U	53	U	54	U	52	UR
Bromodichloromethane	6	U	5	U	6	U	6	U	6	U	6	U	6	U	5	U	5	U	5	UR
1,2-Dichloropropane	6	U	5	U	6	U	6	U	6	U	6	U	6	U	5	U	5	U	5	UR
cis-1,3-Dichloropropene	6	U	5	U	6	U	6	U	6	U	6	U	6	U	5	U	5	U	5	UR
Trichloroethene	6	U	5	U	6	U	6	U	6	U	6	U	6	U	5	U	5	U	5	UR
Benzene	6	U	5	U	6	U	6	U	6	U	6	U	6	U	5	U	5	U	5	UR
Dibromochloromethane	6	U	5	U	6	U	6	U	6	U	6	U	6	U	5	U	5	U	5	UR
1,1,2-Trichloroethane	6	U	5	U	6	U	6	U	6	U	6	U	6	U	5	U	5	U	5	UR
trans-1,3-Dichloropropene	6	U	5	U	6	U	6	U	6	U	6	U	6	U	5	U	5	U	5	UR
2-Chloroethylvinylether	12	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U	10	UR
Bromoform	6	U	5	U	6	U	6	U	6	U	6	U	6	U	5	U	5	U	5	UR
2-Hexanone	58	U	53	U	55	U	55	U	55	U	55	U	55	U	53	U	54	U	52	UR
4-Methyl-2-pentanone	58	U	53	U	55	U	55	U	55	U	55	U	55	U	53	U	54	U	52	UR
Tetrachloroethene	6	U	5	U	6	U	6	U	6	U	6	U	6	U	5	U	5	U	5	UR
1,1,2,2-Tetrachloroethane	6	U	5	U	6	U	6	U	6	U	6	U	6	U	5	U	5	U	4	JR
Toluene	6	U	5	U	6	U	6	U	6	U	6	U	6	U	5	U	5	U	5	UR
Chlorobenzene	6	U	5	U	6	U	6	U	6	U	6	U	6	U	5	U	5	U	5	UR
Ethylbenzene	6	U	5	U	6	U	6	U	6	U	6	U	6	U	5	U	5	U	5	UR
Styrene	6	U	5	U	6	U	6	U	6	U	6	U	6	U	5	U	5	U	5	UR

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-2-SB1(1.5) Concen.	Qualifier	MANG-2-SB2(1.5) Concen.	Qualifier	MANG-2-SB2(3) Concen.	Qualifier	MANG-2-SB3(1) Concen.	Qualifier	MANG-2-SB4(2) Concen.	Qualifier	MANG-2-SB5(1) Concen.	Qualifier	MANG-2-SB5(2) Concen.	Qualifier	MANG-2-SB6(1) Concen.	Qualifier	MANG-2-SB6(2) Concen.	Qualifier	MANG-2-SED1 Concen.	Qualifier
m/p-xylene	6	U	5	U	6	U	6	U	6	U	6	U	6	U	5	U	5	U	5	UR
o-xylene	6	U	5	U	6	U	6	U	6	U	6	U	6	U	5	U	5	U	5	UR
1,3-dichlorobenzene	6	U	5	U	6	U	6	U	6	U	6	U	6	U	5	U	5	U	5	UR
1,2/1,4-dichlorobenzene	6	U	5	U	6	U	6	U	6	U	6	U	6	U	5	U	5	U	5	UR
GC/MS Semivolatile Organics (µg/kg)																				
N-Nitroso-dimethylamine	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Phenol	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Bis(2-chloroethyl)ether	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
2-Chlorophenol	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
1,3-Dichlorobenzene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
1,4-Dichlorobenzene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Benzylalcohol	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
1,2-Dichlorobenzene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
2-Methylphenol	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Bis(2-chloroisopropyl)ether	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
4-Methylphenol	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
N-Nitroso-di-n-propylamine	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Hexachloroethane	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Nitrobenzene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Isophorone	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
2-Nitrophenol	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
2,4-Dimethylphenol	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Bis(2-chloroethoxy)methane	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
2,4-Dichlorophenol	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Benzoic acid	1900	U	1700	U	1800	U	1800	U	1800	U	1800	U	1700	U	8500	U	1700	U	16000	U
1,2,4-Trichlorobenzene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Naphthalene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
4-Chloroaniline	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Hexachlorobutadiene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
4-Chloro-3-methylphenol	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
2-Methylnaphthalene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Hexachlorocyclopentadiene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
2,4,6-Trichlorophenol	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
2,4,5-Trichlorophenol	1900	U	1700	U	1800	U	1800	U	1800	U	1800	U	1700	U	8500	U	1700	U	16000	U
2-Chloronaphthalene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
2-Nitroaniline	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Dimethylphthalate	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-2-SB1(1.5) Concen.	Qualifier	MANG-2-SB2(1.5) Concen.	Qualifier	MANG-2-SB2(3) Concen.	Qualifier	MANG-2-SB3(1) Concen.	Qualifier	MANG-2-SB4(2) Concen.	Qualifier	MANG-2-SB5(1) Concen.	Qualifier	MANG-2-SB5(2) Concen.	Qualifier	MANG-2-SB6(1) Concen.	Qualifier	MANG-2-SB6(2) Concen.	Qualifier	MANG-2-SED1 Concen.	Qualifier
Acenaphthylene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
2,6-Dinitrotoluene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
3-Nitroaniline	1900	U	1700	U	1800	U	1800	U	1800	U	1800	U	1700	U	8500	U	1700	U	16000	U
Acenaphthene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
2,4-Dinitrophenol	1900	U	1700	U	1800	U	1800	U	1800	U	1800	U	1700	U	8500	U	1700	U	16000	U
Dibenzofuran	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
4-Nitrophenol	1900	U	1700	U	1800	U	1800	U	1800	U	1800	U	1700	U	8500	U	1700	U	16000	U
2,4-Dinitrotoluene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Fluorene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Diethylphthalate	6700	D	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
4-Chlorophenylphenylether	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
4-Nitroaniline	1900	U	1700	U	1800	U	1800	U	1800	U	1800	U	1700	U	8500	U	1700	U	16000	U
4,6-Dinitro-2-methylphenol	1900	U	1700	U	1800	U	1800	U	1800	U	1800	U	1700	U	8500	U	1700	U	16000	U
N-Nitrosodiphenylamine	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
4-Bromophenylphenylether	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Hexachlorobenzene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Pentachlorophenol	1900	U	1700	U	1800	U	1800	U	1800	U	1800	U	1700	U	8500	U	1700	U	16000	U
Phenanthrene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Anthracene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	4900	B	3400	B	3400	U
Di-n-butylphthalate	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Fluoranthene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Pyrene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1400	J	660		3400	U
Butylbenzylphthalate	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Benzo(a)anthracene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
3,3'-Dichlorobenzidine	380	U	690	U	730	U	730	U	730	U	730	U	720	U	3500	U	710	U	6800	U
Chrysene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Bis(2-ethylhexyl)phthalate	380	U	350	U	370	U	360	U	360	U	360	U	360	U	2000		570		3400	U
Di-n-octylphthalate	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Benzo(b)fluoranthene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Benzo(k)fluoranthene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Benzo(a)pyrene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Indeno(1,2,3-cd)pyrene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Dibenzo(a,h)anthracene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Benzo(g,h,i)perylene	380	U	350	U	370	U	360	U	360	U	360	U	360	U	1800	U	350	U	3400	U
Metals (mg/kg)																				
Arsenic	4.9		7.8		6.4		4.4		7.4		8.7		3		5.9		2.9		6.5	S
Barium	218		193		409		160		215		231		91.9		219		174		241	

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-2-SB1(1.5)		MANG-2-SB2(1.5)		MANG-2-SB2(3)		MANG-2-SB3(1)		MANG-2-SB4(2)		MANG-2-SB5(1)		MANG-2-SB5(2)		MANG-2-SB6(1)		MANG-2-SB6(2)		MANG-2-SED1	
	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier
Cadmium	0.45	U	0.38	U	0.38	B	0.39	U	0.44	U	0.41	U	0.4	U	0.42	U	0.39	U	0.35	U
Chromium	10.2		8.7		11.2		9.7		4.8		11.5		10.7		12.3		11.5		13.8	
Copper	13.5	*	8.3	*	14.8	*	5.5	*	7.7	*	12.7	*	10.9	*	29.6	*	5.3	*	16.1	
Lead	14.5		3.7	BW	12		10.2		11.5		12.4		8.7		17.7		9.1		14.5	
Mercury	0.051	U	0.039	U	0.055	B	0.03	U	0.046	U	0.048	U	0.048	U	0.049	U	0.051	U	0.04	B
Nickel	13.5	*	9.5	*	7.8	*	6.7	U*	7.5	U*	19.4	*	6.9	U*	7.4	B*	6.7	U*	6.2	B
Selenium	0.32	U	0.27	U	0.33	U	0.29	U	0.3	U	0.5	B	0.31	U	0.27	UW	0.32	U	0.27	B
Silver	1.9	U	1.6	U	1.6	U	1.6	U	1.8	U	1.7	U	1.7	U	1.7	U	1.6	U	1.4	U
Zinc	36.6		35.6		36		36.5		32.3		58.6		41.5		82.3		33.6		63.1	
Total Petroleum Hydrocarbons (mg/kg)	ND		ND		ND		ND		ND		ND		ND		46		ND		82	

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-2-SED2 Concen.	MANG-2-SED2 Qualifier	MANG-2-SED3 Concen.	MANG-2-SED3 Qualifier
GC/MS Volatile Organics (µg/kg)				
Chloromethane	11	UR	11	UR
Bromomethane	11	UR	11	UR
Vinyl chloride	11	UR	11	UR
Chloroethane	11	UR	11	UR
Methylene Chloride	19	UBR	17	UBR
Acrolein	11	UR	11	UR
Acetone	110	UR	110	UR
Acrylonitrile	11	UR	11	UR
Carbon disulfide	11	UR	11	UR
Trichlorofluoromethane	11	UR	11	UR
1,1-Dichloroethene	5	UR	6	UR
1,1-Dichloroethane	5	UR	6	UR
trans-1,2-Dichloroethene	5	UR	6	UR
Chloroform	5	UR	6	UR
1,2-Dichloroethane	5	UR	6	UR
2-Butanone	110	UR	110	UR
1,1,1-Trichloroethane	5	UR	6	UR
Carbon tetrachloride	5	UR	6	UR
Vinyl acetate	54	UR	57	UR
Bromodichloromethane	5	UR	6	UR
1,2-Dichloropropane	5	UR	6	UR
cis-1,3-Dichloropropene	5	UR	6	UR
Trichloroethene	5	UR	6	UR
Benzene	5	UR	6	UR
Dibromochloromethane	5	UR	6	UR
1,1,2-Trichloroethane	5	UR	6	UR
trans-1,3-Dichloropropene	5	UR	6	UR
2-Chloroethylvinylether	11	UR	11	UR
Bromoform	5	UR	6	UR
2-Hexanone	54	UR	57	UR
4-Methyl-2-pentanone	54	UR	57	UR
Tetrachloroethene	5	UR	6	UR
1,1,2,2-Tetrachloroethane	5	UR	6	UR
Toluene	5	UR	6	UR
Chlorobenzene	5	UR	6	UR
Ethylbenzene	5	UR	6	UR
Styrene	5	UR	6	UR

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-2-SED2 Concen.	MANG-2-SED2 Qualifier	MANG-2-SED3 Concen.	MANG-2-SED3 Qualifier
m/p-xylene	5	UR	6	UR
o-xylene	5	UR	6	UR
1,3-dichlorobenzene	5	UR	6	UR
1,2/1,4-dichlorobenzene	5	UR	6	UR
GC/MS Semivolatile Organics (μg/kg)				
N-Nitroso-dimethylamine	3600	U	380	U
Phenol	3600	U	380	U
Bis(2-chloroethyl)ether	3600	U	380	U
2-Chlorophenol	3600	U	380	U
1,3-Dichlorobenzene	3600	U	380	U
1,4-Dichlorobenzene	3600	U	380	U
Benzylalcohol	3600	U	380	U
1,2-Dichlorobenzene	3600	U	380	U
2-Methylphenol	3600	U	380	U
Bis(2-chloroisopropyl)ether	3600	U	380	U
4-Methylphenol	3600	U	380	U
N-Nitroso-di-n-propylamine	3600	U	380	U
Hexachloroethane	3600	U	380	U
Nitrobenzene	3600	U	380	U
Isophorone	3600	U	380	U
2-Nitrophenol	3600	U	380	U
2,4-Dimethylphenol	3600	U	380	U
Bis(2-chloroethoxy)methane	3600	U	380	U
2,4-Dichlorophenol	3600	U	380	U
Benzoic acid	17000	U	1800	U
1,2,4-Trichlorobenzene	3600	U	380	U
Naphthalene	3600	U	380	U
4-Chloroaniline	3600	U	380	U
Hexachlorobutadiene	3600	U	380	U
4-Chloro-3-methylphenol	3600	U	380	U
2-Methylnaphthalene	3600	U	380	U
Hexachlorocyclopentadiene	3600	U	380	U
2,4,6-Trichlorophenol	3600	U	380	U
2,4,5-Trichlorophenol	17000	U	1800	U
2-Chloronaphthalene	3600	U	380	U
2-Nitroaniline	3600	U	380	U
Dimethylphthalate	3600	U	380	U

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-2-SED2 Concen.	MANG-2-SED2 Qualifier	MANG-2-SED3 Concen.	MANG-2-SED3 Qualifier
Acenaphthylene	3600	U	380	U
2,6-Dinitrotoluene	3600	U	380	U
3-Nitroaniline	17000	U	1800	U
Acenaphthene	3600	U	380	U
2,4-Dinitrophenol	17000	U	1800	U
Dibenzofuran	3600	U	380	U
4-Nitrophenol	17000	U	1800	U
2,4-Dinitrotoluene	3600	U	380	U
Fluorene	3600	U	380	U
Diethylphthalate	3600	U	380	U
4-Chlorophenylphenylether	3600	U	380	U
4-Nitroaniline	17000	U	1800	U
4,6-Dinitro-2-methylphenol	17000	U	1800	U
N-Nitrosodiphenylamine	3600	U	380	U
4-Bromophenylphenylether	3600	U	380	U
Hexachlorobenzene	3600	U	380	U
Pentachlorophenol	17000	U	1800	U
Phenanthrene	3600	U	380	U
Anthracene	3600	U	380	U
Di-n-butylphthalate	3600	U	380	U
Fluoroanthene	3600	U	380	U
Pyrene	3600	U	380	U
Butylbenzylphthalate	3600	U	380	U
Benzo(a)anthracene	3600	U	380	U
3,3'-Dichlorobenzidine	7200	U	760	U
Chrysene	3600	U	380	U
Bis(2-ethylhexyl)phthalate	2000	J	380	U
Di-n-octylphthalate	3600	U	380	U
Benzo(b)fluoranthene	1700	J	380	U
Benzo(k)fluoranthene	3600	U	380	U
Benzo(a)pyrene	3600	U	380	U
Indeno(1,2,3-cd)pyrene	3600	U	380	U
Dibenzo(a,h)anthracene	3600	U	380	U
Benzo(g,h,i)perylene	3600	U	380	U
Metals (mg/kg)				
Arsenic	10.3	S	5.8	
Barium	246		150	

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-2-SED2 Concen.	MANG-2-SED2 Qualifier	MANG-2-SED3 Concen.	MANG-2-SED3 Qualifier
Cadmium	24.2		0.76	B
Chromium	64.9		14.5	
Copper	66.9		22.1	
Lead	131		22.6	
Mercury	0.19		0.044	U
Nickel	37.5		6.5	U
Selenium	1.1		0.43	BW
Silver	1.5	U	1.5	U
Zinc	555		120	
Total Petroleum Hydrocarbons (mg/kg)	590		140	

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-3-SB1A(1.5) Concen.	Qualifier	MANG-3-SB2A(1.5) Concen.	Qualifier	MANG-3-SB2A(3.5) Concen.	Qualifier	MANG-3-SB3A(1.0) Concen.	Qualifier	MANG-3-SB3A(1.0)-D Concen.	Qualifier	MANG-3-SB5A(1.5) Concen.	Qualifier	MANG-3-SB6(1.0) Concen.	Qualifier	MANG-3-SB7(1.5) Concen.	Qualifier	MANG-3-SB8(1.5) Concen.	Qualifier
GC/MS Volatile Organics (µg/kg)																		
Chloromethane	11	U	11	U	11	U	10	U	10	U	12	U	13	U	12	U	10	U
Bromomethane	11	U	11	U	11	U	10	U	10	U	12	U	13	U	12	U	10	U
Vinyl chloride	11	U	11	U	11	U	10	U	10	U	12	U	13	U	12	U	10	U
Chloroethane	11	U	11	U	11	U	10	U	10	U	12	U	13	U	12	U	10	U
Methylene Chloride	21	UB	20	UB	13	UB	11	UB	9	UB	18	UB	23	UB	16	UB	12	UB
Acrolein	11	U	11	U	11	U	10	U	10	U	12	U	13	U	12	U	10	U
Acetone	110	U	110	U	110	U	100	U	100	U	120	U	70	J	170		100	U
Acrylonitrile	11	U	11	U	11	U	10	U	10	U	12	U	13	U	12	U	10	U
Carbon disulfide	11	U	11	U	11	U	10	U	10	U	12	U	13	U	12	U	10	U
Trichlorofluoromethane	11	U	11	U	11	U	10	U	10	U	12	U	13	U	12	U	10	U
1,1-Dichloroethene	6	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
1,1-Dichloroethane	6	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
trans-1,2-Dichloroethene	6	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
Chloroform	6	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
1,2-Dichloroethane	6	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
2-Butanone	110	U	110	U	110	U	100	U	100	U	120	U	130	U	120	U	100	U
1,1,1-Trichloroethane	6	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
Carbon tetrachloride	6	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
Vinyl acetate	56	U	53	U	54	U	51	U	51	U	61	U	63	U	61	U	52	U
Bromodichloromethane	6	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
1,2-Dichloropropane	6	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
cis-1,3-Dichloropropene	6	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
Trichloroethene	6	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
Benzene	6	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
Dibromochloromethane	6	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
1,1,2-Trichloroethane	6	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
trans-1,3-Dichloropropene	6	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
2-Chloroethylvinylether	11	U	11	U	11	U	10	U	10	U	12	U	13	U	12	U	10	U
Bromoform	6	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
2-Hexanone	56	U	53	U	54	U	51	U	51	U	61	U	63	U	61	U	52	U
4-Methyl-2-pentanone	56	U	53	U	54	U	51	U	51	U	61	U	63	U	61	U	52	U
Tetrachloroethene	6	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
1,1,2,2-Tetrachloroethane	6	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
Toluene	6	U	7		5	U	5	U	5	U	6	U	6	U	6	U	5	J
Chlorobenzene	6	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
Ethylbenzene	6	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
Styrene	6	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-3-SB1A(1.5)		MANG-3-SB2A(1.5)		MANG-3-SB2A(3.5)		MANG-3-SB3A(1.0)		MANG-3-SB3A(1.0)-D		MANG-3-SB5A(1.5)		MANG-3-SB6(1.0)		MANG-3-SB7(1.5)		MANG-3-SB8(1.5)	
	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier
m/p-xylene	6	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
o-xylene	6	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
1,3-dichlorobenzene	6	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
1,2/1,4-dichlorobenzene	6	U	5	U	5	U	5	U	5	U	6	U	6	U	6	U	5	U
GC/MS Semivolatile Organics (µg/kg)																		
N-Nitroso-dimethylamine	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Phenol	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Bis(2-chloroethyl)ether	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
2-Chlorophenol	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
1,3-Dichlorobenzene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
1,4-Dichlorobenzene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Benzylalcohol	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
1,2-Dichlorobenzene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
2-Methylphenol	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Bis(2-chloroisopropyl)ether	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
4-Methylphenol	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
N-Nitroso-di-n-propylamine	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Hexachloroethane	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Nitrobenzene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Isophorone	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
2-Nitrophenol	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
2,4-Dimethylphenol	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Bis(2-chloroethoxy)methane	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
2,4-Dichlorophenol	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Benzoic acid	1800	U	1700	U	1700	U	1600	U	1600	U	2000	U	2000	U	2000	U	1700	U
1,2,4-Trichlorobenzene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Naphthalene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
4-Chloroaniline	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Hexachlorobutadiene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
4-Chloro-3-methylphenol	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
2-Methylnaphthalene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Hexachlorocyclopentadiene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
2,4,6-Trichlorophenol	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
2,4,5-Trichlorophenol	1800	U	1700	U	1700	U	1600	U	1600	U	2000	U	2000	U	2000	U	1700	U
2-Chloronaphthalene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
2-Nitroaniline	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Dimethylphthalate	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-3-SB1A(1.5) Concen.	Qualifier	MANG-3-SB2A(1.5) Concen.	Qualifier	MANG-3-SB2A(3.5) Concen.	Qualifier	MANG-3-SB3A(1.0) Concen.	Qualifier	MANG-3-SB3A(1.0)-D Concen.	Qualifier	MANG-3-SB5A(1.5) Concen.	Qualifier	MANG-3-SB6(1.0) Concen.	Qualifier	MANG-3-SB7(1.5) Concen.	Qualifier	MANG-3-SB8(1.5) Concen.	Qualifier
Acenaphthylene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
2,6-Dinitrotoluene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
3-Nitroaniline	1800	U	1700	U	1700.	U	1600	U	1600	U	2000	U	2000	U	2000	U	1700	U
Acenaphthene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
2,4-Dinitrophenol	1800	U	1700	U	1700	U	1600	U	1600	U	2000	U	2000	U	2000	U	1700	U
Dibenzofuran	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
4-Nitrophenol	1800	U	1700	U	1700	U	1600	U	1600	U	2000	U	2000	U	2000	U	1700	U
2,4-Dinitrotoluene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Fluorene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Diethylphthalate	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
4-Chlorophenylphenylether	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
4-Nitroaniline	1800	U	1700	U	1700	U	1600	U	1600	U	2000	U	2000	U	2000	U	1700	U
4,6-Dinitro-2-methylphenol	1800	U	1700	U	1700	U	1600	U	1600	U	2000	U	2000	U	2000	U	1700	U
N-Nitrosodiphenylamine	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
4-Bromophenylphenylether	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Hexachlorobenzene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Pentachlorophenol	1800	U	1700	U	1700	U	1600	U	1600	U	2000	U	2000	U	2000	U	1700	U
Phenanthrene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Anthracene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Di-n-butylphthalate	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Fluoroanthene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Pyrene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Butylbenzylphthalate	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Benzo(a)anthracene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
3,3'-Dichlorobenzidine	730	U	690	U	710	U	670	U	680	U	800	U	840	U	800	U	690	U
Chrysene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Bis(2-ethylhexyl)phthalate	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Di-n-octylphthalate	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Benzo(b)fluoranthene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Benzo(k)fluoranthene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Benzo(a)pyrene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Indeno(1,2,3-cd)pyrene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Dibenzo(a,h)anthracene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Benzo(g,h,i)perylene	370	U	350	U	350	U	340	U	340	U	400	U	420	U	400	U	340	U
Metals (mg/kg)																		
Arsenic	7.3		10.2	S	9.2	B	5.4		23.4		6.9		6.9		9.5		2.6	
Barium	173		665		124		44.7		55.7		181		259		202		51	

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-3-SB1A(1.5) Concen.	Qualifier	MANG-3-SB2A(1.5) Concen.	Qualifier	MANG-3-SB2A(3.5) Concen.	Qualifier	MANG-3-SB3A(1.0) Concen.	Qualifier	MANG-3-SB3A(1.0)-D Concen.	Qualifier	MANG-3-SB5A(1.5) Concen.	Qualifier	MANG-3-SB6(1.0) Concen.	Qualifier	MANG-3-SB7(1.5) Concen.	Qualifier	MANG-3-SB8(1.5) Concen.	Qualifier
Cadmium	0.44	U	0.42	U	0.42	U	0.41	U	0.41	U	0.44	U	0.5	U	0.47	U	0.4	U
Chromium	14.8	*	17.5	*	12.2	*	6.2	*	7.3	*	20.8	*	23.2		29.9		4.8	
Copper	19.3		17.3		13.3		3.9	B	21.4		15.5		20.2	*	21.8	*	13.4	*
Lead	9.1		10.5		9.7		3.7	B	5.2	B	9.9		13.1		13.9		3.5	B
Mercury	0.055	U	0.05	U	0.049	U	0.034	U	0.041	U	0.058	U	0.063	UN	0.055	UN	0.052	UN
Nickel	16.8		16.2		15		7	U	7	U	16.2		20.2		22.5		6.8	U
Selenium	0.33	U	0.46	B	0.31	U	0.3	U	0.32	B	0.33	U	0.38	U	0.35	U	0.29	U
Silver	1.8	U	1.7	U	1.7	U	1.7	U	1.7	U	1.8	U	2.1	U	1.9	U	1.6	U
Zinc	51.4		56.8		44.5		24.8		33.8		44.9		58.4	*	71.1	*	24	*
Total Petroleum Hydrocarbons (mg/kg)	ND		ND		ND		ND		ND		ND		ND		ND		ND	

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-3-SB9(1.5) Concen.	MANG-3-SB9(1.5) Qualifier	MANG-3-SB10(1.5) Concen.	MANG-3-SB10(1.5) Qualifier
GC/MS Volatile Organics (μg/kg)				
Chloromethane	11	U	11	U
Bromomethane	11	U	11	U
Vinyl chloride	11	U	11	U
Chloroethane	11	U	11	U
Methylene Chloride	19	UB	23	UB
Acrolein	11	U	11	U
Acetone	70	J	250	
Acrylonitrile	11	U	11	U
Carbon disulfide	11	U	11	U
Trichlorofluoromethane	11	U	11	U
1,1-Dichloroethene	6	U	5	U
1,1-Dichloroethane	6	U	5	U
trans-1,2-Dichloroethene	6	U	5	U
Chloroform	6	U	5	U
1,2-Dichloroethane	6	U	5	U
2-Butanone	110	U	110	U
1,1,1-Trichloroethane	6	U	5	U
Carbon tetrachloride	6	U	5	U
Vinyl acetate	55	U	53	U
Bromodichloromethane	6	U	5	U
1,2-Dichloropropane	6	U	5	U
cis-1,3-Dichloropropene	6	U	5	U
Trichloroethene	6	U	5	U
Benzene	6	U	5	U
Dibromochloromethane	6	U	5	U
1,1,2-Trichloroethane	6	U	5	U
trans-1,3-Dichloropropene	6	U	5	U
2-Chloroethylvinylether	11	U	11	U
Bromoform	6	U	5	U
2-Hexanone	55	U	53	U
4-Methyl-2-pentanone	55	U	53	U
Tetrachloroethene	6	U	5	U
1,1,2,2-Tetrachloroethane	6	U	5	U
Toluene	6	U	5	U
Chlorobenzene	6	U	5	U
Ethylbenzene	6	U	5	U
Styrene	6	U	5	U

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-3-SB9(1.5) Concen.	MANG-3-SB9(1.5) Qualifier	MANG-3-SB10(1.5) Concen.	MANG-3-SB10(1.5) Qualifier
m/p-xylene	6	U	5	U
o-xylene	6	U	5	U
1,3-dichlorobenzene	6	U	5	U
1,2/1,4-dichlorobenzene	6	U	5	U
GC/MS Semivolatile Organics (μg/kg)				
N-Nitroso-dimethylamine	360	U	350	U
Phenol	360	U	350	U
Bis(2-chloroethyl)ether	360	U	350	U
2-Chlorophenol	360	U	350	U
1,3-Dichlorobenzene	360	U	350	U
1,4-Dichlorobenzene	360	U	350	U
Benzylalcohol	360	[illegible]	350	U
1,2-Dichlorobenzene	360	U	350	U
2-Methylphenol	360	U	350	U
Bis(2-chloroisopropyl)ether	360	U	350	U
4-Methylphenol	360	U	350	U
N-Nitroso-di-n-propylamine	360	U	350	U
Hexachloroethane	360	U	350	U
Nitrobenzene	360	U	350	U
Isophorone	360	U	350	U
2-Nitrophenol	360	U	350	U
2,4-Dimethylphenol	360	U	350	U
Bis(2-chloroethoxy)methane	360	U	350	U
2,4-Dichlorophenol	360	U	350	U
Benzoic acid	1800	U	1700	U
1,2,4-Trichlorobenzene	360	U	350	U
Naphthalene	360	U	350	U
4-Chloroaniline	360	U	350	U
Hexachlorobutadiene	360	U	350	U
4-Chloro-3-methylphenol	360	U	350	U
2-Methylnaphthalene	360	U	350	U
Hexachlorocyclopentadiene	360	U	350	U
2,4,6-Trichlorophenol	360	U	350	U
2,4,5-Trichlorophenol	1800	U	1700	U
2-Chloronaphthalene	360	U	350	U
2-Nitroaniline	360	U	350	U
Dimethylphthalate	360	U	350	U

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-3-SB9(1.5) Concen.	Qualifier	MANG-3-SB10(1.5) Concen.	Qualifier
Acenaphthylene	360	U	350	U
2,6-Dinitrotoluene	360	U	350	U
3-Nitroaniline	1800	U	1700	U
Acenaphthene	360	U	350	U
2,4-Dinitrophenol	1800	U	1700	U
Dibenzofuran	360	U	350	U
4-Nitrophenol	1800	U	1700	U
2,4-Dinitrotoluene	360	U	350	U
Fluorene	360	U	350	U
Diethylphthalate	590		110	J
4-Chlorophenylphenylether	360	U	350	U
4-Nitroaniline	1800	U	1700	U
4,6-Dinitro-2-methylphenol	1800	U	1700	U
N-Nitrosodiphenylamine	360	U	350	U
4-Bromophenylphenylether	360	U	350	U
Hexachlorobenzene	360	U	350	U
Pentachlorophenol	1800	U	1700	U
Phenanthrene	360	U	350	U
Anthracene	360	U	350	U
Di-n-butylphthalate	1200	B	350	U
Fluoroanthene	360	U	350	U
Pyrene	360	U	350	U
Butylbenzylphthalate	200	J	350	U
Benzo(a)anthracene	360	U	350	U
3,3'-Dichlorobenzidine	730	U	700	U
Chrysene	360	U	350	U
Bis(2-ethylhexyl)phthalate	360	U	350	U
Di-n-octylphthalate	360	U	350	U
Benzo(b)fluoranthene	360	U	350	U
Benzo(k)fluoranthene	360	U	350	U
Benzo(a)pyrene	360	U	350	U
Indeno(1,2,3-cd)pyrene	360	U	350	U
Dibenzo(a,h)anthracene	360	U	350	U
Benzo(g,h,i)perylene	360	U	350	U
Metals (mg/kg)				
Arsenic	7.2		7.9	
Barium	176		274	

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-3-SB9(1.5)		MANG-3-SB10(1.5)	
	Concen.	Qualifier	Concen.	Qualifier
Cadmium	0.4	U	0.38	U
Chromium	15.5		13.8	
Copper	17.6	*	17.2	*
Lead	9		8.9	
Mercury	0.05	UN	0.051	UN
Nickel	9.5		15.7	
Selenium	0.31	U	0.3	UW
Silver	1.6	U	1.6	U
Zinc	46.4	*	60.2	*
Total Petroleum Hydrocarbons (mg/kg)	ND		ND	

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-4-SB1(1) Concen.	Qualifier	MANG-4-SB1(5.5) Concen.	Qualifier	MANG-4-SB2(1) Concen.	Qualifier	MANG-4-SB2(1)-D Concen.	Qualifier	MANG-4-SB2(3.5) Concen.	Qualifier	MANG-4-SB2(3.5)-D Concen.	Qualifier	MANG-4-SB3(3.0) Concen.	Qualifier	MANG-4-SB3(7) Concen.	Qualifier	MANG-4-SB4(1.5) Concen.	Qualifier
GC/MS Volatile Organics (μg/kg)																		
Chloromethane	11	U	11	U	11	UJ	11	U	54	UJ	11	U	11	UJ	11	U	11	U
Bromomethane	11	U	11	U	11	UJ	11	U	54	UJ	11	U	11	UJ	11	U	11	U
Vinyl chloride	11	U	11	U	11	UJ	11	U	54	UJ	11	U	11	UJ	11	U	11	U
Chloroethane	11	U	11	U	11	UJ	11	U	54	UJ	11	U	11	UJ	11	U	11	U
Methylene Chloride	9	UB	12	UB	12	UB	9	UB	60	UB	25	UB	16	UB	14	UB	11	UB
Acrolein	11	U	11	U	11	UJ	11	U	54	UJ	11	U	11	UJ	11	U	11	U
Acetone	110	U	140		110	UJ	110	U	540	UJ	110	U	160	J	110	U	110	U
Acrylonitrile	11	U	11	U	11	UJ	11	U	54	UJ	11	U	11	UJ	11	U	11	U
Carbon disulfide	11	U	11	U	11	UJ	11	U	54	UJ	11	U	11	UJ	11	U	11	U
Trichlorofluoromethane	11	U	11	U	11	UJ	11	U	54	UJ	11	U	11	UJ	11	U	11	U
1,1-Dichloroethene	6	U	6	U	6	UJ	5	U	27	UJ	6	U	5	UJ	6	U	6	U
1,1-Dichloroethane	6	U	6	U	6	UJ	5	U	27	UJ	6	U	5	UJ	6	U	6	U
trans-1,2-Dichloroethene	6	U	6	U	6	UJ	5	U	27	UJ	6	U	5	UJ	6	U	6	U
Chloroform	6	U	6	U	6	UJ	5	U	27	UJ	6	U	5	UJ	6	U	6	U
1,2-Dichloroethane	6	U	6	U	6	UJ	5	U	27	UJ	6	U	5	UJ	6	U	6	U
2-Butanone	110	U	110	U	110	UJ	110	U	540	UJ	110	U	110	UJ	110	U	110	U
1,1,1-Trichloroethane	6	U	6	U	6	UJ	5	U	27	UJ	6	U	5	UJ	6	U	6	U
Carbon tetrachloride	6	U	6	U	6	UJ	5	U	27	UJ	6	U	5	UJ	6	U	6	U
Vinyl acetate	55	U	57	U	57	UJ	53	U	270	UJ	55	U	53	UJ	55	U	55	U
bromodichloromethane	6	U	6	U	6	UJ	5	U	27	UJ	6	U	5	UJ	6	U	6	U
1,2-Dichloropropane	6	U	6	U	6	UJ	5	U	27	UJ	6	U	5	UJ	6	U	6	U
cis-1,3-Dichloropropene	6	U	6	U	6	UJ	5	U	27	UJ	6	U	5	UJ	6	U	6	U
Trichloroethene	6	U	6	U	6	UJ	5	U	27	UJ	6	U	5	UJ	6	U	6	U
Benzene	6	U	6	U	6	UJ	5	U	27	UJ	6	U	5	UJ	6	U	6	U
Dibromochloromethane	6	U	6	U	6	UJ	5	U	27	UJ	6	U	5	UJ	6	U	6	U
1,1,2-Trichloroethane	6	U	6	U	6	UJ	5	U	27	UJ	6	U	5	UJ	6	U	6	U
trans-1,3-Dichloropropene	6	U	6	U	6	UJ	5	U	27	UJ	6	U	5	UJ	6	U	6	U
2-Chloroethylvinylether	11	U	11	U	11	UJ	11	U	54	UJ	11	U	11	UJ	11	U	11	U
Bromoform	6	U	6	U	6	UJ	5	U	27	UJ	6	U	5	UJ	6	U	6	U
2-Hexanone	55	U	57	U	57	UJ	53	U	270	UJ	55	U	53	UJ	55	U	55	U
4-Methyl-2-pentanone	55	U	57	U	57	UJ	53	U	270	UJ	55	U	53	UJ	55	U	55	U
Tetrachloroethene	6	U	6	U	6	UJ	5	U	27	UJ	6	U	5	UJ	6	U	6	U
1,1,2,2-Tetrachloroethane	6	U	6	U	6	UJ	5	U	27	UJ	6	U	5	UJ	6	U	6	U
Toluene	6	U	6	U	6	UJ	5	U	27	UJ	6	U	6	J	6	U	6	U
Chlorobenzene	6	U	6	U	6	UJ	5	U	27	UJ	6	U	5	UJ	6	U	6	U
Ethylbenzene	6	U	6	U	6	UJ	5	U	27	UJ	6	U	5	UJ	6	U	6	U
Styrene	6	U	6	U	6	UJ	5	U	27	UJ	6	U	5	UJ	6	U	6	U

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-4-SB1(1) Concen.	Qualifier	MANG-4-SB1(5.5) Concen.	Qualifier	MANG-4-SB2(1) Concen.	Qualifier	MANG-4-SB2(1)-D Concen.	Qualifier	MANG-4-SB2(3.5) Concen.	Qualifier	MANG-4-SB2(3.5)-D Concen.	Qualifier	MANG-4-SB3(3.0) Concen.	Qualifier	MANG-4-SB3(7) Concen.	Qualifier	MANG-4-SB4(1.5) Concen.	Qualifier
m/p-xylene	6	U	6	U	6	UJ	5	U	27	UJ	6	U	5	UJ	6	U	6	U
o-xylene	6	U	6	U	6	UJ	5	U	27	UJ	6	U	5	UJ	6	U	6	U
1,3-dichlorobenzene	6	U	6	U	6	UJ	5	U	27	UJ	6	U	5	UJ	6	U	6	U
1,2/1,4-dichlorobenzene	6	U	6	U	6	UJ	5	U	27	UJ	6	U	5	UJ	6	U	6	U
GC/MS Semivolatile Organics (μg/kg)																		
N-Nitroso-dimethylamine	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Phenol	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Bis(2-chloroethyl)ether	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
2-Chlorophenol	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
1,3-Dichlorobenzene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
1,4-Dichlorobenzene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Benzylalcohol	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
1,2-Dichlorobenzene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
2-Methylphenol	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Bis(2-chloroisopropyl)ether	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
4-Methylphenol	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
N-Nitroso-di-n-propylamine	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Hexachloroethane	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Nitrobenzene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Isophorone	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
2-Nitrophenol	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
2,4-Dimethylphenol	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Bis(2-chloroethoxy)methane	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
2,4-Dichlorophenol	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Benzoic acid	8800	U	1800	U	18000	U	1700	U	17000	U	1800	U	1700	U	1700	U	8900	U
1,2,4-Trichlorobenzene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Naphthalene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
4-Chloroaniline	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Hexachlorobutadiene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
4-Chloro-3-methylphenol	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
2-Methylnaphthalene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Hexachlorocyclopentadiene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
2,4,6-Trichlorophenol	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
2,4,5-Trichlorophenol	8800	U	1800	U	18000	U	1700	U	17000	U	1800	U	1700	U	1700	U	8900	U
2-Chloronaphthalene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
2-Nitroaniline	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Dimethylphthalate	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-4-SB1(1) Concen.	Qualifier	MANG-4-SB1(5.5) Concen.	Qualifier	MANG-4-SB2(1) Concen.	Qualifier	MANG-4-SB2(1)-D Concen.	Qualifier	MANG-4-SB2(3.5) Concen.	Qualifier	MANG-4-SB2(3.5)-D Concen.	Qualifier	MANG-4-SB3(3.0) Concen.	Qualifier	MANG-4-SB3(7) Concen.	Qualifier	MANG-4-SB4(1.5) Concen.	Qualifier
Acenaphthylene	1800	U	380	U	[illegible]	U	340	U	3600	U	360	U	350	U	360	U	1800	U
2,6-Dinitrotoluene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
3-Nitroaniline	8800	U	1800	U	18000	U	1700	U	17000	U	1800	U	1700	U	1700	U	8900	U
Acenaphthene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
2,4-Dinitrophenol	8800	U	1800	U	18000	U	1700	U	17000	U	1800	U	1700	U	1700	U	8900	U
Dibenzofuran	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
4-Nitrophenol	8800	U	1800	U	18000	U	1700	U	17000	U	1800	U	1700	U	1700	U	8900	U
2,4-Dinitrotoluene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Fluorene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Diethylphthalate	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
4-Chlorophenylphenylether	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
4-Nitroaniline	8800	U	1800	U	18000	U	1700	U	17000	U	1800	U	1700	U	1700	U	8900	U
4,6-Dinitro-2-methylphenol	8800	U	1800	U	18000	U	1700	U	17000	U	1800	U	1700	U	1700	U	8900	U
N-Nitrosodiphenylamine	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
4-Bromophenylphenylether	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Hexachlorobenzene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Pentachlorophenol	8800	U	1800	U	18000	U	1700	U	17000	U	1800	U	1700	U	1700	U	8900	U
Phenanthrene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Anthracene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Di-n-butylphthalate	3400	U	4100	B	3800	UB	2300	UB	3600	U	330	UB	1500	UB	1700	UB	8900	B
Fluoranthene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Pyrene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Butylbenzylphthalate	1800	U	410		3800	U	340	U	3600	U	360	U	1400	B	360	U	1800	U
Benzo(a)anthracene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
3,3'-Dichlorobenzidine	3600	U	760	U	7500	U	690	U	7200	U	730	U	700	U	720	U	3700	U
Chrysene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Bis(2-ethylhexyl)phthalate	1800	U	240	J	3800	U	340	U	3600	U	360	U	120	J	360	U	1800	U
Di-n-octylphthalate	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Benzo(b)fluoranthene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Benzo(k)fluoranthene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Benzo(a)pyrene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Indeno(1,2,3-cd)pyrene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Dibenzo(a,h)anthracene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Benzo(g,h,i)perylene	1800	U	380	U	3800	U	340	U	3600	U	360	U	350	U	360	U	1800	U
Metals (mg/kg)																		
Arsenic	6.5	S	3.9		7.4		5		3.8		5.3		7.9		3.6		6.3	
Barium	214		219		219		170		165		214		290		138		238	

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-4-SB1(1) Concen.	MANG-4-SB1(1) Qualifier	MANG-4-SB1(5.5) Concen.	MANG-4-SB1(5.5) Qualifier	MANG-4-SB2(1) Concen.	MANG-4-SB2(1) Qualifier	MANG-4-SB2(1)-D Concen.	MANG-4-SB2(1)-D Qualifier	MANG-4-SB2(3.5) Concen.	MANG-4-SB2(3.5) Qualifier	MANG-4-SB2(3.5)-D Concen.	MANG-4-SB2(3.5)-D Qualifier	MANG-4-SB3(3.0) Concen.	MANG-4-SB3(3.0) Qualifier	MANG-4-SB3(7) Concen.	MANG-4-SB3(7) Qualifier	MANG-4-SB4(1.5) Concen.	MANG-4-SB4(1.5) Qualifier
Cadmium	0.39	U	0.43	U	0.42	U	0.38	U	0.41	U	0.42	U	0.39	U	0.39	U	0.44	U
Chromium	9.8		10.5		17		9.3		6.4		11.6		8.4		9.6		12.4	
Copper	10.6	*	10.9	*	15.1	*	7.4	*	11.8	*	10.1		7.8	*	7	*	14.2	
Lead	10.5		10.6		16.7		9.3		8.7		7.6	N	10.2		9.1		13.8	N
Mercury	0.055	U	0.034	U	0.052	U	0.048	U	0.54	U	0.046	U	0.046	U	0.039	U	0.055	U
Nickel	8.4	*	7.3	U*	13.8	*	6.5	U*	7.5	B*	8.4		9	*	6.7	U*	7.6	U
Selenium	0.28	U	0.31	U	0.33	UW	0.31	UW	0.28	U	0.32	U	0.3	U	0.32	UW	0.27	U
Silver	1.6	U	1.8	U	1.7	U	1.6	U	1.7	U	1.7	U	1.6	U	1.6	U	1.8	U
Zinc	35.8		47.4		48.4		34.3		36		36.5	*	47.5		48.8		38.8	*
Total Petroleum Hydrocarbons (mg/kg)	83		ND		86		1500		600		230		ND		ND		88	

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-4-SB4(7) Concen.	Qualifier	MANG-4-SB5(1.5) Concen.	Qualifier	MANG-4-SB5(3.5) Concen.	Qualifier
GC/MS Volatile Organics (μg/kg)						
Chloromethane	11	U	11	U	12	U
Bromomethane	11	U	11	U	12	U
Vinyl chloride	11	U	11	U	12	U
Chloroethane	11	U	11	U	12	U
Methylene Chloride	9	UB	9	UB	11	UB
Acrolein	11	U	11	U	12	U
Acetone	110	U	110	U	52	J
Acrylonitrile	11	U	11	U	12	U
Carbon disulfide	11	U	11	U	12	U
Trichlorofluoromethane	11	U	11	U	12	U
1,1-Dichloroethene	6	U	6	U	6	U
1,1-Dichloroethane	6	U	6	U	6	U
trans-1,2-Dichloroethene	6	U	6	U	6	U
Chloroform	6	U	6	U	6	U
1,2-Dichloroethane	6	U	6	U	6	U
2-Butanone	110	U	110	U	120	U
1,1,1-Trichloroethane	6	U	6	U	6	U
Carbon tetrachloride	6	U	6	U	6	U
Vinyl acetate	55	U	57	U	59	U
bromodichloromethane	6	U	6	U	6	U
1,2-Dichloropropane	6	U	6	U	6	U
cis-1,3-Dichloropropene	6	U	6	U	6	U
Trichloroethene	6	U	6	U	6	U
Benzene	6	U	6	U	6	U
Dibromochloromethane	6	U	6	U	6	U
1,1,2-Trichloroethane	6	U	6	U	6	U
trans-1,3-Dichloropropene	6	U	6	U	6	U
2-Chloroethylvinylether	11	U	11	U	12	U
Bromoform	6	U	6	U	6	U
2-Hexanone	55	U	57	U	59	U
4-Methyl-2-pentanone	55	U	57	U	59	U
Tetrachloroethene	6	U	6	U	6	U
1,1,2,2-Tetrachloroethane	6	U	6	U	6	U
Toluene	6	U	6	U	6	U
Chlorobenzene	6	U	6	U	6	U
Ethylbenzene	6	U	6	U	6	U
Styrene	6	U	6	U	6	U

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-4-SB4(7) Concen.	Qualifier	MANG-4-SB5(1.5) Concen.	Qualifier	MANG-4-SB5(3.5) Concen.	Qualifier
m/p-xylene	6	U	6	U	6	U
o-xylene	6	U	6	U	6	U
1,3-dichlorobenzene	6	U	6	U	6	U
1 2/1,4-dichlorobenzene	6	U	6	U	6	U
GC/MS Semivolatile Organics (μg/kg)						
N-Nitroso-dimethylamine	360	U	1900	UJ	390	U
Phenol	360	U	1900	UJ	390	U
Bis(2-chloroethyl)ether	360	U	1900	UJ	390	U
2-Chlorophenol	360	U	1900	UJ	390	U
1,3-Dichlorobenzene	360	U	1900	UJ	390	U
1,4-Dichlorobenzene	360	U	1900	UJ	390	U
Benzylalcohol	360	U	1900	UJ	390	U
1,2-Dichlorobenzene	360	U	1900	UJ	390	U
2-Methylphenol	360	U	1900	UJ	390	U
Bis(2-chloroisopropyl)ether	360	U	1900	UJ	390	U
4-Methylphenol	360	U	1900	UJ	390	U
N-Nitroso-di-n-propylamine	360	U	1900	UJ	390	U
Hexachloroethane	360	U	1900	UJ	390	U
Nitrobenzene	360	U	1900	UJ	390	U
Isophorone	360	U	1900	UJ	390	U
2-Nitrophenol	360	U	1900	UJ	390	U
2,4-Dimethylphenol	360	U	1900	UJ	390	U
Bis(2-chloroethoxy)methane	360	U	1900	UJ	390	U
2,4-Dichlorophenol	360	U	1900	UJ	390	U
Benzoic acid	1700	U	9100	UJ	1900	U
1,2,4-Trichlorobenzene	360	U	1900	UJ	390	U
Naphthalene	360	U	1900	UJ	390	U
4-Chloroaniline	360	U	1900	UJ	390	U
Hexachlorobutadiene	360	U	1900	UJ	390	U
4-Chloro-3-methylphenol	360	U	1900	UJ	390	U
2-Methylnaphthalene	360	U	1900	UJ	390	U
Hexachlorocyclopentadiene	360	U	1900	UJ	390	U
2,4,6-Trichlorophenol	360	U	1900	UJ	390	U
2,4,5-Trichlorophenol	1700	U	9100	UJ	1900	U
2-Chloronaphthalene	360	U	1900	UJ	390	U
2-Nitroaniline	360	U	1900	UJ	390	U
Dimethylphthalate	360	U	1900	UJ	390	U

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-4-SB4(7) Concen.	Qualifier	MANG-4-SB5(1.5) Concen.	Qualifier	MANG-4-SB5(3.5) Concen.	Qualifier
Acenaphthylene	360	U	1900	UJ	390	U
2,6-Dinitrotoluene	360	U	1900	UJ	390	U
3-Nitroaniline	1700	U	9100	UJ	1900	U
Acenaphthene	360	U	1900	UJ	390	U
2,4-Dinitrophenol	1700	U	9100	UJ	1900	U
Dibenzofuran	360	U	1900	UJ	390	U
4-Nitrophenol	1700	U	9100	UJ	1900	U
2,4-Dinitrotoluene	360	U	1900	UJ	390	U
Fluorene	360	U	1900	UJ	390	U
Diethylphthalate	1700		9100	UJ	1900	U
4-Chlorophenylphenylether	360	U	1900	UJ	390	U
4-Nitroaniline	1700	U	9100	UJ	1900	U
4,6-Dinitro-2-methylphenol	1700	U	9100	UJ	1900	U
N-Nitrosodiphenylamine	360	U	1900	UJ	390	U
4-Bromophenylphenylether	360	U	1900	UJ	390	U
Hexachlorobenzene	360	U	1900	UJ	390	U
Pentachlorophenol	1700	U	9100	UJ	1900	U
Phenanthrene	360	U	1900	UJ	390	U
Anthracene	360	U	1900	UJ	390	U
Di-n-butylphthalate	360	U	1900	UJ	390	U
Fluoroanthene	360	U	1900	UJ	390	U
Pyrene	360	U	1900	UJ	390	U
Butylbenzylphthalate	360	U	1900	UJ	390	U
Benzo(a)anthracene	360	U	1900	UJ	390	U
3,3'-Dichlorobenzidine	720	U	3800	UJ	780	U
Chrysene	360	U	1900	UJ	390	U
Bis(2-ethylhexyl)phthalate	360	U	1900	UJ	390	U
Di-n-octylphthalate	360	U	1900	UJ	390	U
Benzo(b)fluoranthene	360	U	1900	UJ	390	U
Benzo(k)fluoranthene	360	U	1900	UJ	390	U
Benzo(a)pyrene	360	U	1900	UJ	390	U
Indeno(1,2,3-cd)pyrene	360	U	1900	UJ	390	U
Dibenzo(a,h)anthracene	360	U	1900	UJ	390	U
Benzo(g,h,i)perylene	360	U	1900	UJ	390	U
Metals (mg/kg)						
Arsenic	4.5		6.3		7	
Barium	1190		260		205	

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-4-SB4(7)		MANG-4-SB5(1.5)		MANG-4-SB5(3.5)	
	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier
Cadmium	0.42	U	0.41	U	0.4	U
Chromium	10.6		13.6		20.6	
Copper	34.9		18.5		16.1	
Lead	7.5	N	12.2	N	15.4	N
Mercury	0.04	U	0.039	U	0.045	U
Nickel	7.1	U	7.1	B	12.1	
Selenium	0.29	U	0.32	U	0.35	U
Silver	1.7	U	1.7	U	1.7	U
Zinc	47.1	*	45.4	*	46.8	*
Total Petroleum Hydrocarbons (mg/kg)	ND		140		ND	

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-5-SB1(3.5) Concen.	Qualifier	MANG-5-SB1(7.5) Concen.	Qualifier	MANG-5-SB2(1) Concen.	Qualifier	MANG-5-SB3(1.5) Concen.	Qualifier	MANG-5-SB3(5) Concen.	Qualifier	MANG-5-SB4(5.5) Concen.	Qualifier
GC/MS Volatile Organics (µg/kg)												
Chloromethane	11	U	11	U	11	U	11	U	12	U	11	U
Bromomethane	11	U	11	U	11	U	11	U	12	U	11	U
Vinyl chloride	11	U	11	U	11	U	11	U	12	U	11	U
Chloroethane	11	U	11	U	11	U	11	U	12	U	11	U
Methylene Chloride	17	UB	18	UB	26	UB	28	UB	26	UB	25	UB
Acrolein	11	U	11	U	11	U	11	U	12	U	11	U
Acetone	110	U	120		110	U	110	U	140		17	J
Acrylonitrile	11	U	11	U	11	U	11	U	12	U	11	U
Carbon disulfide	11	U	11	U	11	U	11	U	12	U	11	U
Trichlorofluoromethane	11	U	11	U	11	U	11	U	12	U	11	U
1,1-Dichloroethene	5	U	6	U	6	U	6	U	6	U	6	U
1,1-Dichloroethane	5	U	6	U	6	U	6	U	6	U	6	U
trans-1,2-Dichloroethene	5	U	6	U	6	U	6	U	6	U	6	U
Chloroform	5	U	6	U	6	U	6	U	6	U	6	U
1,2-Dichloroethane	5	U	6	U	6	U	6	U	6	U	6	U
2-Butanone	110	U	110	U	110	U	110	U	120	U	110	U
1,1,1-Trichloroethane	5	U	6	U	6	U	6	U	6	U	6	U
Carbon tetrachloride	5	U	6	U	6	U	6	U	6	U	6	U
Vinyl acetate	53	U	55	U	56	U	56	U	60	U	55	U
Bromodichloromethane	5	U	6	U	6	U	6	U	6	U	6	U
1,2-Dichloropropane	5	U	6	U	6	U	6	U	6	U	6	U
cis-1,3-Dichloropropene	5	U	6	U	6	U	6	U	6	U	6	U
Trichloroethene	5	U	6	U	6	U	6	U	6	U	6	U
Benzene	5	U	6	U	6	U	6	U	6	U	6	U
Dibromochloromethane	5	U	6	U	6	U	6	U	6	U	6	U
1,1,2-Trichloroethane	5	U	6	U	6	U	6	U	6	U	6	U
trans-1,3-Dichloropropene	5	U	6	U	6	U	6	U	6	U	6	U
2-Chloroethylvinylether	11	U	11	U	11	U	11	U	12	U	11	U
Bromoform	5	U	6	U	6	U	6	U	6	U	6	U
2-Hexanone	53	U	55	U	56	U	56	U	60	U	55	U
4-Methyl-2-pentanone	53	U	55	U	56	U	56	U	60	U	55	U
Tetrachloroethene	5	U	6	U	6	U	6	U	6	U	6	U
1,1,2,2-Tetrachloroethane	5	U	6	U	6	U	6	U	6	U	6	U
Toluene	10		6	U	6	U	6	U	6	J	6	U
Chlorobenzene	5	U	6	U	6	U	6	U	6	U	6	U
Ethylbenzene	5	U	6	U	6	U	6	U	6	U	6	U
Styrene	5	U	6	U	6	U	6	U	6	U	6	U

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-5-SB1(3.5)		MANG-5-SB1(7.5)		MANG-5-SB2(1)		MANG-5-SB3(1.5)		MANG-5-SB3(5)		MANG-5-SB4(5.5)	
	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier
m/p-xylene	5	U	6	U	6	U	6	U	6	U	6	U
o-xylene	5	U	6	U	6	U	6	U	6	U	6	U
1,3-dichlorobenzene	5	U	6	U	6	U	6	U	6	U	6	U
1,2/1,4-dichlorobenzene	5	U	6	U	6	U	6	U	6	U	6	U
GC/MS Semivolatile Organics (μg/kg)												
N-Nitroso-dimethylamine	350	U	360	U	370	U	3700	U	390	U	370	U
Phenol	350	U	360	U	370	U	3700	U	390	U	370	U
Bis(2-chloroethyl)ether	350	U	360	U	370	U	3700	U	390	U	370	U
2-Chlorophenol	350	U	360	U	370	U	3700	U	390	U	370	U
1,3-Dichlorobenzene	350	U	360	U	370	U	3700	U	390	U	370	U
1,4-Dichlorobenzene	350	U	360	U	370	U	3700	U	390	U	370	U
Benzylalcohol	350	U	360	U	370	U	3700	U	390	U	370	U
1,2-Dichlorobenzene	350	U	360	U	370	U	3700	U	390	U	370	U
2-Methylphenol	350	U	360	U	370	U	3700	U	390	U	370	U
Bis(2-chloroisopropyl)ether	350	U	360	U	370	U	3700	U	390	U	370	U
4-Methylphenol	350	U	360	U	370	U	3700	U	390	U	370	U
N-Nitroso-di-n-propylamine	350	U	360	U	370	U	3700	U	390	U	370	U
Hexachloroethane	350	U	360	U	370	U	3700	U	390	U	370	U
Nitrobenzene	350	U	360	U	370	U	3700	U	390	U	370	U
Isophorone	350	U	360	U	370	U	3700	U	390	U	370	U
2-Nitrophenol	350	U	360	U	370	U	3700	U	390	U	370	U
2,4-Dimethylphenol	350	U	360	U	370	U	3700	U	390	U	370	U
Bis(2-chloroethoxy)methane	350	U	360	U	370	U	3700	U	390	U	370	U
2,4-Dichlorophenol	350	U	360	U	370	U	3700	U	390	U	370	U
Benzoic acid	1700	U	1800	U	1800	U	18000	U	1900	U	1800	U
1,2,4-Trichlorobenzene	350	U	360	U	370	U	3700	U	390	U	370	U
Naphthalene	350	U	360	U	370	U	3700	U	390	U	370	U
4-Chloroaniline	350	U	360	U	370	U	3700	U	390	U	370	U
Hexachlorobutadiene	350	U	360	U	370	U	3700	U	390	U	370	U
4-Chloro-3-methylphenol	350	U	360	U	370	U	3700	U	390	U	370	U
2-Methylnaphthalene	350	U	360	U	370	U	3700	U	390	U	370	U
Hexachlorocyclopentadiene	350	U	360	U	370	U	3700	U	390	U	370	U
2,4,6-Trichlorophenol	350	U	360	U	370	U	3700	U	390	U	370	U
2,4,5-Trichlorophenol	1700	U	1800	U	1800	U	18000	U	1900	U	1800	U
2-Chloronaphthalene	350	U	360	U	370	U	3700	U	390	U	370	U
2-Nitroaniline	350	U	360	U	370	U	3700	U	390	U	370	U
Dimethylphthalate	350	U	360	U	370	U	3700	U	390	U	370	U

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-5-SB1(3.5) Concen.	Qualifier	MANG-5-SB1(7.5) Concen.	Qualifier	MANG-5-SB2(1) Concen.	Qualifier	MANG-5-SB3(1.5) Concen.	Qualifier	MANG-5-SB3(5) Concen.	Qualifier	MANG-5-SB4(5.5) Concen.	Qualifier
Acenaphthylene	350	U	360	U	370	U	3700	U	390	U	370	U
2,6-Dinitrotoluene	350	U	360	U	370	U	3700	U	390	U	370	U
3-Nitroaniline	1700	U	1800	U	1800	U	18000	U	1900	U	1800	U
Acenaphthene	350	U	360	U	370	U	3700	U	390	U	370	U
2,4-Dinitrophenol	1700	U	1800	U	1800	U	18000	U	1900	U	1800	U
Dibenzofuran	350	U	360	U	370	U	3700	U	390	U	370	U
4-Nitrophenol	1700	U	1800	U	1800	U	18000	U	1900	U	1800	U
2,4-Dinitrotoluene	350	U	360	U	370	U	3700	U	390	U	370	U
Fluorene	350	U	360	U	370	U	3700	U	390	U	370	U
Diethylphthalate	350	U	360	U	370	U	3700	U	390	U	370	U
4-Chlorophenylphenylether	350	U	360	U	370	U	3700	U	390	U	370	U
4-Nitroaniline	1700	U	1800	U	1800	U	18000	U	1900	U	1800	U
4,6-Dinitro-2-methylphenol	1700	U	1800	U	1800	U	18000	U	1900	U	1800	U
N-Nitrosodiphenylamine	350	U	360	U	370	U	3700	U	390	U	370	U
4-Bromophenylphenylether	350	U	360	U	370	U	3700	U	390	U	370	U
Hexachlorobenzene	350	U	360	U	370	U	3700	U	390	U	370	U
Pentachlorophenol	1700	U	1800	U	1800	U	18000	U	1900	U	1800	U
Phenanthrene	350	U	360	U	370	U	3700	U	390	U	370	U
Anthracene	350	U	360	U	370	U	3700	U	390	U	370	U
Di-n-butylphthalate	350	U	360	U	370	U	3700	U	390	U	370	U
Fluoroanthene	350	U	360	U	370	U	3700	U	390	U	370	U
Pyrene	350	U	360	U	370	U	3700	U	390	U	370	U
Butylbenzylphthalate	350	U	360	U	370	U	3700	U	390	U	370	U
Benzo(a)anthracene	350	U	360	U	370	U	3700	U	390	U	370	U
3,3'-Dichlorobenzidine	690	U	730	U	740	U	7300	U	790	U	730	U
Chrysene	350	U	360	U	370	U	3700	U	390	U	370	U
Bis(2-ethylhexyl)phthalate	350	U	360	U	370	U	3700	U	390	U	370	U
Di-n-octylphthalate	350	U	360	U	370	U	3700	U	390	U	370	U
Benzo(b)fluoranthene	350	U	360	U	370	U	3700	U	390	U	370	U
Benzo(k)fluoranthene	350	U	360	U	370	U	3700	U	390	U	370	U
Benzo(a)pyrene	350	U	360	U	370	U	3700	U	390	U	370	U
Indeno(1,2,3-cd)pyrene	350	U	360	U	370	U	3700	U	390	U	370	U
Dibenzo(a,h)anthracene	350	U	360	U	370	U	3700	U	390	U	370	U
Benzo(g,h,i)perylene	350	U	360	U	370	U	3700	U	390	U	370	U
Metals (mg/kg)												
Arsenic	22.5		3.1		6.5		7	S	7.3		4.2	
Barium	155		187		218		258		285		437	

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG 5-SB1(3.5) Concen.	Qualifier	MANG-5-SB1(7.5) Concen.	Qualifier	MANG-5-SB2(1) Concen.	Qualifier	MANG-5-SB3(1.5) Concen.	Qualifier	MANG-5-SB3(5) Concen.	Qualifier	MANG-5-SB4(5.5) Concen.	Qualifier
Cadmium	0.38	U	0.42	U	0.42	U	0.39	U	0.43	U	0.42	U
Chromium	16.3		9.5		12.7		12		22.8		9.7	
Copper	31.6	*	5.7	*	11.5	*	31	*	14.8	*	8.7	*
Lead	12.7		5.2	B	9.5		7.5		11.4		5.4	
Mercury	0.048	UN	0.048	UN	0.045	UN	0.048	UN	0.057	UN	0.055	UN
Nickel	6.5	U	7.2	U	9.4		9.7		16.1		7.2	U
Selenium	0.3	U	0.32	U	0.3	U	0.29	BWJ	0.32	UW	0.27	UW
Silver	1.6	U	1.7	U	1.7	U	1.6	U	1.8	U	1.7	U
Zinc	61.2	*	40.7	*	38.8	*	47	*	50.6	*	26.4	*
Total Petroleum Hydrocarbons (mg/kg)	ND		ND		ND		160		ND		ND	

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-6-SB1(1.5) Concen.	Qualifier	MANG-6-SB1(3.5) Concen.	Qualifier	MANG-6-SB2(1.5) Concen.	Qualifier	MANG-6-SB2(7) Concen.	Qualifier	MANG-6-SB3(5.5) Concen.	Qualifier	MANG-6-SB4(5) Concen.	Qualifier	MANG-6-SB5(3.5) Concen.	Qualifier	MANG-6-SB6(3.5) Concen.	Qualifier	MANG-6-SB7(1) Concen.	Qualifier
GC/MS Volatile Organics (µg/kg)																		
Chloromethane	11	U	12	U	1400	U	12	U	1400	UJ	1400	UJ	11	U	11	U	11	U
Bromomethane	11	U	12	U	1400	U	12	U	1400	UJ	1400	UJ	11	U	11	U	11	U
Vinyl chloride	11	U	12	U	1400	U	12	U	1400	UJ	1400	UJ	11	U	11	U	11	U
Chloroethane	11	U	12	U	1400	U	12	U	1400	UJ	1400	UJ	11	U	11	U	11	U
Methylene Chloride	18	UB	17	UB	2000	UB	16	UB	2300	UB	2400	UB	11	UB	14	UB	25	UB
Acrolein	11	U	12	U	1400	U	12	U	1400	UJ	1400	UJ	11	U	11	U	11	U
Acetone	520	D	570	D	14000	U	99	J	14000	UJ	14000	UJ	110	U	110	U	110	U
Acrylonitrile	11	U	12	U	1400	U	12	U	1400	UJ	1400	UJ	11	U	11	U	11	U
Carbon disulfide	11	U	12	U	1400	U	12	U	1400	UJ	1400	UJ	11	U	11	U	11	U
Trichlorofluoromethane	11	U	12	U	1400	U	12	U	1400	UJ	1400	UJ	11	U	11	U	11	U
1,1-Dichloroethene	6	U	6	U	710	U	6	U	710	UJ	680	UJ	6	U	6	U	6	U
1,1-Dichloroethane	6	U	6	U	710	U	6	U	710	UJ	680	UJ	6	U	6	U	6	U
trans-1,2-Dichloroethene	6	U	6	U	710	U	6	U	710	UJ	680	UJ	6	U	6	U	6	U
Chloroform	6	U	6	U	710	U	6	U	710	UJ	680	UJ	6	U	6	U	6	U
1,2-Dichloroethane	6	U	6	U	710	U	6	U	710	UJ	680	UJ	6	U	6	U	6	U
2-Butanone	110	U	120	U	14000	U	120	U	14000	UJ	14000	UJ	110	U	110	U	110	U
1,1,1-Trichloroethane	6	U	6	U	710	U	6	U	710	UJ	680	UJ	6	U	6	U	6	U
Carbon tetrachloride	6	U	6	U	710	U	6	U	710	UJ	680	UJ	6	U	6	U	6	U
Vinyl acetate	56	U	58	U	7100	U	59	U	7100	UJ	6800	UJ	56	U	55	U	55	U
Bromodichloromethane	6	U	6	U	710	U	6	U	710	UJ	680	UJ	6	U	6	U	6	U
1,2-Dichloropropane	6	U	6	U	710	U	6	U	710	UJ	680	UJ	6	U	6	U	6	U
cis-1,3-Dichloropropene	6	U	6	U	710	U	6	U	710	UJ	680	UJ	6	U	6	U	6	U
Trichloroethene	6	U	6	U	710	U	6	U	4000	J	680	J	6	U	6	U	6	U
Benzene	6	U	6	U	710	U	6	U	710	UJ	680	UJ	6	U	6	U	6	U
Dibromochloromethane	6	U	6	U	710	U	6	U	710	UJ	680	UJ	6	U	6	U	6	U
1,1,2-Trichloroethane	6	U	6	U	710	U	6	U	710	UJ	680	UJ	6	U	6	U	6	U
trans-1,3-Dichloropropene	6	U	6	U	710	U	6	U	710	UJ	680	UJ	6	U	6	U	6	U
2-Chloroethylvinylether	11	U	12	U	1400	U	12	U	1400	UJ	680	UJ	11	U	11	U	11	U
Bromoform	6	U	6	U	710	U	6	U	710	UJ	680	UJ	6	U	6	U	6	U
2-Hexanone	56	U	58	U	7100	U	59	U	7100	UJ	680	UJ	56	U	55	U	55	U
4-Methyl-2-pentanone	56	U	58	U	7100	U	59	U	7100	UJ	680	UJ	56	U	55	U	55	U
Tetrachloroethene	6	U	6	U	710	U	6	U	710	UJ	680	UJ	6	U	6	U	6	U
1,1,2,2-Tetrachloroethane	6	U	6	U	710	U	6	U	710	UJ	680	UJ	6	U	6	U	6	U
Toluene	4	J	5	J	710	U	6	U	17000	J	4000	J	6	U	6	U	6	U
Chlorobenzene	6	U	6	U	710	U	6	U	710	UJ	680	UJ	6	U	6	U	6	U
Ethylbenzene	6	U	6	U	710	U	6	U	1600	J	770	J	6	U	6	U	6	U
Styrene	6	U	6	U	710	U	6	U	710	UJ	680	UJ	6	U	6	U	6	U

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-6-SB1(1.5)		MANG-6-SB1(3.5)		MANG-6-SB2(1.5)		MANG-6-SB2(7)		MANG-6-SB3(5.5)		MANG-6-SB4(5)		MANG-6-SB5(3.5)		MANG-6-SB6(3.5)		MANG-6-SB7(1)	
	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier
m/p-xylene	6	U	6	U	710	U	6	U	7900	J	4200	J	6	U	6	U	6	U
o-xylene	6	U	6	U	710	U	6	U	2600	J	2300	J	6	U	6	U	6	U
1,3-dichlorobenzene	6	U	6	U	710	U	6	U	710	UJ	680	UJ	6	U	6	U	6	U
1,2/1,4-dichlorobenzene	6	U	6	U	710	U	6	U	710	UJ	680	UJ	6	U	6	U	6	U
GC/MS Semivolatile Organics (µg/kg)																		
N-Nitroso-dimethylamine	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Phenol	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Bis(2-chloroethyl)ether	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
2-Chlorophenol	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
1,3-Dichlorobenzene	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
1,4-Dichlorobenzene	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Benzylalcohol	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
1,2-Dichlorobenzene	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
2-Methylphenol	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Bis(2-chloroisopropyl)ether	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
4-Methylphenol	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
N-Nitroso-di-n-propylamine	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Hexachloroethane	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Nitrobenzene	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Isophorone	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
2-Nitrophenol	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
2,4-Dimethylphenol	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Bis(2-chloroethoxy)methane	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
2,4-Dichlorophenol	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Benzoic acid	1800	U	1900	U	18000	U	1900	U	18000	UJ	17000	UJ	1800	U	1800	U	3600	U
1,2,4-Trichlorobenzene	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Naphthalene	370	U	380	U	3800	U	390	U	3000	J	2100	J	370	U	360	U	730	U
4-Chloroaniline	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Hexachlorobutadiene	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
4-Chloro-3-methylphenol	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
2-Methylnaphthalene	370	U	380	U	3800	U	390	U	2700	J	2600	J	370	U	360	U	730	U
Hexachlorocyclopentadiene	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
2,4,6-Trichlorophenol	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
2,4,5-Trichlorophenol	1800	U	1900	U	18000	U	1900	U	18000	UJ	17000	UJ	1800	U	1800	U	3600	U
2-Chloronaphthalene	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
2-Nitroaniline	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Dimethylphthalate	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-6-SB1(1.5) Concen.	MANG-6-SB1(1.5) Qualifier	MANG-6-SB1(3.5) Concen.	MANG-6-SB1(3.5) Qualifier	MANG-6-SB2(1.5) Concen.	MANG-6-SB2(1.5) Qualifier	MANG-6-SB2(7) Concen.	MANG-6-SB2(7) Qualifier	MANG-6-SB3(5.5) Concen.	MANG-6-SB3(5.5) Qualifier	MANG-6-SB4(5) Concen.	MANG-6-SB4(5) Qualifier	MANG-6-SB5(3.5) Concen.	MANG-6-SB5(3.5) Qualifier	MANG-6-SB6(3.5) Concen.	MANG-6-SB6(3.5) Qualifier	MANG-6-SB7(1) Concen.	MANG-6-SB7(1) Qualifier
Acenaphthylene	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
2,6-Dinitrotoluene	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
3-Nitroaniline	1800	U	1900	U	18000	U	1900	U	18000	UJ	17000	UJ	1800	U	1800	U	3600	U
Acenaphthene	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
2,4-Dinitrophenol	1800	U	1900	U	18000	U	1900	U	18000	UJ	17000	UJ	1800	U	1800	U	3600	U
Dibenzofuran	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
4-Nitrophenol	1800	U	1900	U	18000	U	1900	U	18000	UJ	17000	UJ	1800	U	1800	U	3600	U
2,4-Dinitrotoluene	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Fluorene	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Diethylphthalate	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
4-Chlorophenylphenylether	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
4-Nitroaniline	1800	U	1900	U	18000	U	1900	U	18000	UJ	17000	UJ	1800	U	1800	U	3600	U
4,6-Dinitro-2-methylphenol	1800	U	1900	U	18000	U	1900	U	18000	UJ	17000	UJ	1800	U	1800	U	3600	U
N-Nitrosodiphenylamine	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
4-Bromophenylphenylether	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Hexachlorobenzene	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Pentachlorophenol	1800	U	1900	U	18000	U	1900	U	18000	UJ	17000	UJ	1800	U	1800	U	3600	U
Phenanthrene	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Anthracene	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Di-n-butylphthalate	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	660	UB	1300	UB	730	U
Fluoroanthene	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Pyrene	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Butylbenzylphthalate	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Benzo(a)anthracene	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
3,3'-Dichlorobenzidine	730	U	770	U	7500	U	780	U	7400	UJ	7200	UJ	740	U	730	U	1500	U
Chrysene	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Bis(2-ethylhexyl)phthalate	370	U	380	U	3800	U	130	J	3700	UJ	3600	UJ	370	U	360	U	730	U
Di-n-octylphthalate	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Benzo(b)fluoranthene	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Benzo(k)fluoranthene	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Benzo(a)pyrene	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Indeno(1,2,3-cd)pyrene	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Dibenzo(a,h)anthracene	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Benzo(g,h,i)perylene	370	U	380	U	3800	U	390	U	3700	UJ	3600	UJ	370	U	360	U	730	U
Metals (mg/kg)																		
Arsenic	6.2		4.5		4.4		3.4		3.2	B	2.6		2.2		2.1		5.9	
Barium	187		189		155		73		145		164		261		333		267	

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-6-SB1(1.5) Concen.	Qualifier	MANG-6-SB1(3.5) Concen.	Qualifier	MANG-6-SB2(1.5) Concen.	Qualifier	MANG-6-SB2(7) Concen.	Qualifier	MANG-6-SB3(5.5) Concen.	Qualifier	MANG-6-SB4(5) Concen.	Qualifier	MANG-6-SB5(3.5) Concen.	Qualifier	MANG-6-SB6(3.5) Concen.	Qualifier	MANG-6-SB7(1) Concen.	Qualifier
Cadmium	0.44	U	0.4	U	0.42	U	0.44	U	0.41	B	0.39	U	0.43	U	0.41	U	0.43	U
Chromium	12.2		10.4		12.3		7.7		18.3		8.1		9.5		11.5		12.9	*
Copper	18.5	*	14.4	*	12.3	*	4.2	B*	7.4		8.5		4.7	B	6.1		43.4	
Lead	11.7		12.6		28.3		14.7		52.3	N	12	N	7.5	N	7.6	N	9.5	
Mercury	0.053	U	0.046	U	0.05	U	0.049	U	0.056	U	0.047	U	0.039	U	0.048	U	0.055	U
Nickel	10.4	*	6.9	U*	7.2	U*	7.5	U*	7	U	11		7.4	U	7.7	B	7.3	U
Selenium	0.26	U	0.35	UW	0.28	UW	0.33	UW	0.3	U	0.29	U	0.3	U	0.3	U	0.29	U
Silver	1.8	U	1.6	U	1.7	U	1.8	U	1.7	U	1.6	U	1.8	U	1.7	U	1.8	U
Zinc	51.1		38.5		36.8		10.1		33.7	*	35.8	*	17.7	*	15.6	*	60.8	
Total Petroleum Hydrocarbons (mg/kg)	12		ND		120		ND		3300		8100		12		52		310	

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-6-SB7(1)-D Concen.	MANG-6-SB7(1)-D Qualifier	MANG-6-SB8(1.5) Concen.	MANG-6-SB8(1.5) Qualifier	MANG-6-SB9(1.0) Concen.	MANG-6-SB9(1.0) Qualifier	MANG-6-SB10(1.5) Concen.	MANG-6-SB10(1.5) Qualifier	MANG-6-SB11(1.3) Concen.	MANG-6-SB11(1.3) Qualifier	MANG-6-SB12(3.5) Concen.	MANG-6-SB12(3.5) Qualifier	MANG-6-SB13(1.0) Concen.	MANG-6-SB13(1.0) Qualifier	MANG-6-SB14(5.5) Concen.	MANG-6-SB14(5.5) Qualifier	MANG-6-SD1 Concen.	MANG-6-SD1 Qualifier
GC/MS Volatile Organics (µg/kg)																		
Chloromethane	11	U	11	U	11	U	11	U	10	U	11	U	11	U	11	U	11	UR
Bromomethane	11	U	11	U	11	U	11	U	10	U	11	U	11	U	11	U	11	UR
Vinyl chloride	11	U	11	U	11	U	11	U	10	U	11	U	11	U	11	U	11	UR
Chloroethane	11	U	11	U	11	U	11	U	10	U	11	U	11	U	11	U	11	UR
Methylene Chloride	8	UB	11	UB	15	UB	16	UB	15	UB	15	UB	11	UB	14	UB	24	UBR
Acrolein	11	U	11	U	11	U	11	U	10	U	11	U	11	U	11	U	11	UR
Acetone	110	U	110	U	170		110	U	100		200		180		66	J	110	UR
Acrylonitrile	11	U	11	U	11	U	11	U	10	U	11	U	11	U	11	U	11	UR
Carbon disulfide	11	U	11	U	11	U	11	U	10	U	11	U	11	U	11	U	11	UR
Trichlorofluoromethane	11	U	11	U	11	U	11	U	10	U	11	U	11	U	11	U	11	UR
1,1-Dichloroethene	6	U	5	U	5	U	6	U	5	U	6	U	5	U	6	U	6	UR
1,1-Dichloroethane	6	U	5	U	5	U	6	U	5	U	6	U	5	U	6	U	6	UR
trans-1,2-Dichloroethene	6	U	5	U	5	U	6	U	5	U	6	U	5	U	6	U	6	UR
Chloroform	6	U	5	U	5	U	6	U	5	U	6	U	5	U	6	U	6	UR
1,2-Dichloroethane	6	U	5	U	5	U	6	U	5	U	6	U	5	U	6	U	6	UR
2-Butanone	110	U	110	U	110	U	110	U	100	U	110	U	110	U	110	U	110	UR
1,1,1-Trichloroethane	6	U	5	U	5	U	6	U	5	U	6	U	5	U	6	U	6	UR
Carbon tetrachloride	6	U	5	U	5	U	6	U	5	U	6	U	5	U	6	U	6	UR
Vinyl acetate	56	U	54	U	54	U	55	U	51	U	55	U	54	U	56	U	55	UR
Bromodichloromethane	6	U	5	U	5	U	6	U	5	U	6	U	5	U	6	U	6	UR
1,2-Dichloropropane	6	U	5	U	5	U	6	U	5	U	6	U	5	U	6	U	6	UR
cis-1,3-Dichloropropene	6	U	5	U	5	U	6	U	5	U	6	U	5	U	6	U	6	UR
Trichloroethene	6	U	5	U	5	U	6	U	5	U	6	U	5	U	6	U	6	UR
Benzene	6	U	5	U	5	U	6	U	5	U	6	U	5	U	6	U	6	UR
Dibromochloromethane	6	U	5	U	5	U	6	U	5	U	6	U	5	U	6	U	6	UR
1,1,2-Trichloroethane	6	U	5	U	5	U	6	U	5	U	6	U	5	U	6	U	6	UR
trans-1,3-Dichloropropene	6	U	5	U	5	U	6	U	5	U	6	U	5	U	6	U	6	UR
2-Chloroethylvinylether	11	U	11	U	11	U	11	U	10	U	11	U	11	U	11	U	11	UR
Bromoform	6	U	5	U	5	U	6	U	5	U	6	U	5	U	6	U	6	UR
2-Hexanone	56	U	54	U	54	U	55	U	51	U	55	U	54	U	56	U	55	UR
4-Methyl-2-pentanone	56	U	54	U	54	U	55	U	51	U	55	U	54	U	56	U	55	UR
Tetrachloroethene	6	U	5	U	5	U	6	U	5	U	6	U	5	U	6	U	6	UR
1,1,2,2-Tetrachloroethane	6	U	5	U	5	U	6	U	5	U	6	U	5	U	6	U	6	UR
Toluene	6	U	5	U	5	U	6	U	5	U	6	U	7		6	U	6	UR
Chlorobenzene	6	U	5	U	5	U	6	U	5	U	6	U	5	U	6	U	6	UR
Ethylbenzene	6	U	5	U	5	U	6	U	5	U	6	U	5	U	6	U	6	UR
Styrene	6	U	5	U	5	U	6	U	5	U	6	U	5	U	6	U	6	UR

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-6-SB7(1)-D Concen.	Qualifier	MANG-6-SB8(1.5) Concen.	Qualifier	MANG-6-SB9(1.0) Concen.	Qualifier	MANG-6-SB10(1.5) Concen.	Qualifier	MANG-6-SB11(1.3) Concen.	Qualifier	MANG-6-SB12(3.5) Concen.	Qualifier	MANG-6-SB13(1.0) Concen.	Qualifier	MANG-6-SB14(5.5) Concen.	Qualifier	MANG-6-SD1 Concen.	Qualifier
m/p-xylene	6	U	5	U	5	U	6	U	5	U	6	U	5	U	6	U	6	UR
o-xylene	6	U	5	U	5	U	6	U	5	U	6	U	5	U	6	U	6	UR
1,3-dichlorobenzene	6	U	5	U	5	U	6	U	5	U	6	U	5	U	6	U	6	UR
1,2/1,4-dichlorobenzene	6	U	5	U	5	U	6	U	5	U	6	U	5	U	6	U	6	UR
GC/MS Semivolatile Organics (µg/kg)																		
N-Nitroso-dimethylamine	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Phenol	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Bis(2-chloroethyl)ether	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
2-Chlorophenol	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
1,3-Dichlorobenzene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
1,4-Dichlorobenzene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Benzylalcohol	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
1,2-Dichlorobenzene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
2-Methylphenol	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Bis(2-chloroisopropyl)ether	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
4-Methylphenol	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
N-Nitroso-di-n-propylamine	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Hexachloroethane	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Nitrobenzene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Isophorone	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
2-Nitrophenol	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
2,4-Dimethylphenol	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Bis(2-chloroethoxy)methane	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
2,4-Dichlorophenol	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Benzoic acid	1800	U	1700	U	35000	U	1800	U	33000	U	8800	U	1700	U	1800	U	1100000	U
1,2,4-Trichlorobenzene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Naphthalene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
4-Chloroaniline	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Hexachlorobutadiene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
4-Chloro-3-methylphenol	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
2-Methylnaphthalene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Hexachlorocyclopentadiene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
2,4,6-Trichlorophenol	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
2,4,5-Trichlorophenol	1800	U	1700	U	35000	U	1800	U	33000	U	8800	U	1700	U	1800	U	1100000	U
2-Chloronaphthalene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
2-Nitroaniline	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Dimethylphthalate	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-6-SB7(1)-D Concen.	Qualifier	MANG-6-SB8(1.5) Concen.	Qualifier	MANG-6-SB9(1.0) Concen.	Qualifier	MANG-6-SB10(1.5) Concen.	Qualifier	MANG-6-SB11(1.3) Concen.	Qualifier	MANG-6-SB12(3.5) Concen.	Qualifier	MANG-6-SB13(1.0) Concen.	Qualifier	MANG-6-SB14(5.5) Concen.	Qualifier	MANG-6-SD1 Concen.	Qualifier
Acenaphthylene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
2,6-Dinitrotoluene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
3-Nitroaniline	1800	U	1700	U	35000	U	1800	U	33000	U	8800	U	1700	U	1800	U	1100000	U
Acenaphthene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
2,4-Dinitrophenol	1800	U	1700	U	35000	U	1800	U	33000	U	8800	U	1700	U	1800	U	1100000	U
Dibenzofuran	370	U	360	U	7200	U	360	U	6700	U	1830	U	360	U	360	U	220000	U
4-Nitrophenol	1800	U	1700	U	35000	U	1800	U	33000	U	8800	U	1700	U	1800	U	1100000	U
2,4-Dinitrotoluene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Fluorene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Diethylphthalate	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
4-Chlorophenylphenylether	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
4-Nitroaniline	1800	U	1700	U	35000	U	1800	U	33000	U	8800	U	1700	U	1800	U	1100000	U
4,6-Dinitro-2-methylphenol	1800	U	1700	U	35000	U	1800	U	33000	U	8800	U	1700	U	1800	U	1100000	U
N-Nitrosodiphenylamine	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
4-Bromophenylphenylether	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Hexachlorobenzene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Pentachlorophenol	1800	U	1700	U	35000	U	1800	U	33000	U	8800	U	1700	U	1800	U	1100000	U
Phenanthrene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Anthracene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Di-n-butylphthalate	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Fluoroanthene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Pyrene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Butylbenzylphthalate	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Benzo(a)anthracene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
3,3'-Dichlorobenzidine	740	U	730	U	14000	U	730	U	13000	U	3630	U	720	U	730	U	440000	U
Chrysene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Bis(2-ethylhexyl)phthalate	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Di-n-octylphthalate	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Benzo(b)fluoranthene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Benzo(k)fluoranthene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Benzo(a)pyrene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Indeno(1,2,3-cd)pyrene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Dibenzo(a,h)anthracene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Benzo(g,h,i)perylene	370	U	360	U	7200	U	360	U	6700	U	1800	U	360	U	360	U	220000	U
Metals (mg/kg)																		
Arsenic	4.5		3.6		7.2		3.8		3		4.3	S	4.8		2.4		6.3	
Barium	132		152		464		171		165		168		140		108.0		294	

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-6-SB7(1)-D Concen.	Qualifier	MANG-6-SB8(1.5) Concen.	Qualifier	MANG-6-SB9(1.0) Concen.	Qualifier	MANG-6-SB10(1.5) Concen.	Qualifier	MANG-6-SB11(1.3) Concen.	Qualifier	MANG-6-SB12(3.5) Concen.	Qualifier	MANG-6-SB13(1.0) Concen.	Qualifier	MANG-6-SB14(5.5) Concen.	Qualifier	MANG-6-SD1 Concen.	Qualifier
Cadmium	0.44	U	0.39	U	0.38	U	0.42	U	0.35	B	0.38	U	0.43	U	0.4	U	5.4	
Chromium	14.4	*	10.3	*	11.3	*	7.9	*	9.5	*	16.7	*	7.2	*	8.9	*	43.2	*
Copper	15.2		5.6		16.7		11.2		26.3		13.5		9.1		10.0		34.6	
Lead	9.6		2.5	B	8.2		4.9	B	6.1		4.6	B	4.7	B	4.3	B	236	
Mercury	0.034	U	0.047	U	0.049	U	0.038	U	0.041	U	0.055	U	0.052	U	0.06	U	0.044	U
Nickel	12.4		6.6	U	7.3	B	7.1	U	9		9.6		7.3	U	6.6	U	18.9	
Selenium	0.28	U	0.32	U	0.27	UW	0.31	U	0.37	BW	0.35	BW	0.32	UW	0.3	U	0.41	B
Silver	1.8	U	1.6	U	1.5	U	1.7	U	1.4	U	1.6	U	1.7	U	1.6	U	1.8	U
Zinc	43.1		36.6		42.1		38.7		48.4		45.7		27.7		53.7		23.8	
Total Petroleum Hydrocarbons (mg/kg)	ND		170		650		130		13000		16		60		ND		1700	

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-6-SD2 Concen.	MANG-6-SD2 Qualifier	MANG-6-SD2-D Concen.	MANG-6-SD2-D Qualifier	MANG-6-SD3 Concen.	MANG-6-SD3 Qualifier
GC/MS Volatile Organics (µg/kg)						
Chloromethane	13	UR	13	UR	13	UR
Bromomethane	13	UR	13	UR	13	UR
Vinyl chloride	13	UR	13	UR	13	UR
Chloroethane	13	UR	13	UR	13	UR
Methylene Chloride	29	UBR	29	UBR	24	UBR
Acrolein	13	UR	13	UR	13	UR
Acetone	130	UR	130	UR	130	UR
Acrylonitrile	13	UR	13	UR	13	UR
Carbon disulfide	13	UR	13	UR	13	UR
Trichlorofluoromethane	13	UR	13	UR	13	UR
1,1-Dichloroethene	6	UR	7	UR	7	UR
1,1-Dichloroethane	6	UR	7	UR	7	UR
trans-1,2-Dichloroethene	6	UR	7	UR	7	UR
Chloroform	6	UR	7	UR	7	UR
1,2-Dichloroethane	6	UR	7	UR	7	UR
2-Butanone	130	UR	130	UR	130	UR
1,1,1-Trichloroethane	6	UR	7	UR	7	UR
Carbon tetrachloride	6	UR	7	UR	7	UR
Vinyl acetate	63	UR	66	UR	65	UR
Bromodichloromethane	6	UR	7	UR	7	UR
1,2-Dichloropropane	6	UR	7	UR	7	UR
cis-1,3-Dichloropropene	6	UR	7	UR	7	UR
Trichloroethene	6	UR	7	UR	7	UR
Benzene	6	UR	7	UR	7	UR
Dibromochloromethane	6	UR	7	UR	7	UR
1,1,2-Trichloroethane	6	UR	7	UR	7	UR
trans-1,3-Dichloropropene	6	UR	7	UR	7	UR
2-Chloroethylvinylether	13	UR	13	UR	13	UR
Bromoform	6	UR	7	UR	7	UR
2-Hexanone	63	UR	66	UR	65	UR
4-Methyl-2-pentanone	63	UR	66	UR	65	UR
Tetrachloroethene	6	UR	7	UR	7	UR
1,1,2,2-Tetrachloroethane	6	UR	7	UR	7	UR
Toluene	6	UR	7	UR	7	UR
Chlorobenzene	6	UR	7	UR	7	UR
Ethylbenzene	6	UR	7	UR	7	UR
Styrene	6	UR	7	UR	7	UR

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-6-SD2 Concen.	MANG-6-SD2 Qualifier	MANG-6-SD2-D Concen.	MANG-6-SD2-D Qualifier	MANG-6-SD3 Concen.	MANG-6-SD3 Qualifier
m/p-xylene	6	UR	7	UR	7	UR
o-xylene	6	UR	7	UR	7	UR
1,3-dichlorobenzene	6	UR	7	UR	7	UR
1,2/1,4-dichlorobenzene	6	UR	7	UR	7	UR
GC/MS Semivolatile Organics (μg/kg)						
N-Nitroso-dimethylamine	250000	U	260000	U	260000	U
Phenol	250000	U	260000	U	260000	U
Bis(2-chloroethyl)ether	250000	U	260000	U	260000	U
2-Chlorophenol	250000	U	260000	U	260000	U
1,3-Dichlorobenzene	250000	U	260000	U	260000	U
1,4-Dichlorobenzene	250000	U	260000	U	260000	U
Benzylalcohol	250000	U	260000	U	260000	U
1,2-Dichlorobenzene	250000	U	260000	U	260000	U
2-Methylphenol	250000	U	260000	U	260000	U
Bis(2-chloroisopropyl)ether	250000	U	260000	U	260000	U
4-Methylphenol	250000	U	260000	U	260000	U
N-Nitroso-di-n-propylamine	250000	U	260000	U	260000	U
Hexachloroethane	250000	U	260000	U	260000	U
Nitrobenzene	250000	U	260000	U	260000	U
Isophorone	250000	U	260000	U	260000	U
2-Nitrophenol	250000	U	260000	U	260000	U
2,4-Dimethylphenol	250000	U	260000	U	260000	U
Bis(2-chloroethoxy)methane	250000	U	260000	U	260000	U
2,4-Dichlorophenol	250000	U	260000	U	260000	U
Benzoic acid	1200000	U	1300000	U	1300000	U
1,2,4-Trichlorobenzene	250000	U	260000	U	260000	U
Naphthalene	250000	U	260000	U	260000	U
4-Chloroaniline	250000	U	260000	U	260000	U
Hexachlorobutadiene	250000	U	260000	U	260000	U
4-Chloro-3-methylphenol	250000	U	260000	U	260000	U
2-Methylnaphthalene	250000	U	260000	U	260000	U
Hexachlorocyclopentadiene	250000	U	260000	U	260000	U
2,4,6-Trichlorophenol	250000	U	260000	U	260000	U
2,4,5-Trichlorophenol	1200000	U	1300000	U	1300000	U
2-Chloronaphthalene	250000	U	260000	U	260000	U
2-Nitroaniline	250000	U	260000	U	260000	U
Dimethylphthalate	250000	U	260000	U	260000	U

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-6-SD2 Concen.	MANG-6-SD2 Qualifier	MANG-6-SD2-D Concen.	MANG-6-SD2-D Qualifier	MANG-6-SD3 Concen.	MANG-6-SD3 Qualifier
Acenaphthylene	250000	U	260000	U	260000	U
2,6-Dinitrotoluene	250000	U	260000	U	260000	U
3-Nitroaniline	1200000	U	1300000	U	1300000	U
Acenaphthene	250000	U	260000	U	260000	U
2,4-Dinitrophenol	1200000	U	1300000	U	1300000	U
Dibenzofuran	250000	U	260000	U	260000	U
4-Nitrophenol	1200000	U	1300000	U	1300000	U
2,4-Dinitrotoluene	250000	U	260000	U	260000	U
Fluorene	250000	U	260000	U	260000	U
Diethylphthalate	250000	U	260000	U	260000	U
4-Chlorophenylphenylether	250000	U	260000	U	260000	U
4-Nitroaniline	1200000	U	1300000	U	1300000	U
4,6-Dinitro-2-methylphenol	1200000	U	1300000	U	1300000	U
N-Nitrosodiphenylamine	250000	U	260000	U	260000	U
4-Bromophenylphenylether	250000	U	260000	U	260000	U
Hexachlorobenzene	250000	U	260000	U	260000	U
Pentachlorophenol	1200000	U	1300000	U	1300000	U
Phenanthrene	250000	U	260000	U	260000	U
Anthracene	250000	U	260000	U	260000	U
Di-n-butylphthalate	250000	U	260000	U	260000	U
Fluoroanthene	250000	U	260000	U	260000	U
Pyrene	250000	U	260000	U	260000	U
Butylbenzylphthalate	250000	U	260000	U	260000	U
Benzo(a)anthracene	250000	U	260000	U	260000	U
3,3'-Dichlorobenzidine	510000	U	260000	U	52000	U
Chrysene	250000	U	260000	U	260000	U
Bis(2-ethylhexyl)phthalate	250000	U	260000	U	260000	U
Di-n-octylphthalate	250000	U	260000	U	260000	U
Benzo(b)fluoranthene	250000	U	260000	U	260000	U
Benzo(k)fluoranthene	250000	U	260000	U	260000	U
Benzo(a)pyrene	250000	U	260000	U	260000	U
Indeno(1,2,3-cd)pyrene	250000	U	260000	U	260000	U
Dibenzo(a,h)anthracene	250000	U	260000	U	260000	U
Benzo(g,h,i)perylene	250000	U	260000	U	260000	U
Metals (mg/kg)						
Arsenic	4.9		5.9	S	5.3	
Barium	269		344		311	

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-6-SD2		MANG-6-SD2-D		MANG-6-SD3	
	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier
Cadmium	6.4		6		5.9	
Chromium	57.1	*	53.4	*	58.8	*
Copper	34.8		42.3		48.5	
Lead	529		211		284	
Mercury	0.061	B	0.065	B	0.061	B
Nickel	15.6		16.7		17.1	
Selenium	0.36	U	0.34	U	0.37	U
Silver	1.7	U	2	U	1.9	U
Zinc	284		251		249	
Total Petroleum Hydrocarbons (mg/kg)	3000		2600		2500	

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-7-SB1(1.5) Concen.	MANG-7-SB1(1.5) Qualifier	MANG-7-SB2(1) Concen.	MANG-7-SB2(1) Qualifier	MANG-7-SB3(3.5) Concen.	MANG-7-SB3(3.5) Qualifier	MANG-7-SB3(5.5) Concen.	MANG-7-SB3(5.5) Qualifier	MANG-7-SB4(5) Concen.	MANG-7-SB4(5) Qualifier
GC/MS Volatile Organics (μg/kg)										
Chloromethane	10	U	11	U	7200	U	15000	U	11	U
Bromomethane	10	U	11	U	7200	U	15000	U	11	U
Vinyl chloride	10	U	11	U	7200	U	15000	U	11	U
Chloroethane	10	U	11	U	7200	U	15000	U	11	U
Methylene Chloride	35	UB	30	UB	5700	UB	13000	UB	16	UB
Acrolein	10	U	11	U	7200	U	15000	U	11	U
Acetone	100	U	110	U	72000	U	150000	U	100	J
Acrylonitrile	10	U	11	U	7200	U	15000	U	11	U
Carbon disulfide	10	U	11	U	7200	U	15000	U	11	U
Trichlorofluoromethane	10	U	11	U	7200	U	15000	U	11	U
1,1-Dichloroethene	5	U	5	U	3600	U	7300	U	6	U
1,1-Dichloroethane	5	U	5	U	3600	U	7300	U	6	U
trans-1,2-Dichloroethene	5	U	5	U	3600	U	7300	U	6	U
Chloroform	5	U	5	U	3600	U	7300	U	6	U
1,2-Dichloroethane	5	U	5	U	3600	U	7300	U	6	U
2-Butanone	100	U	110	U	72000	U	150000	U	110	U
1,1,1-Trichloroethane	5	U	5	U	3600	U	7300	U	6	U
Carbon tetrachloride	5	U	5	U	3600	U	7300	U	6	U
Vinyl acetate	52	U	54	U	36000	U	73000	U	56	U
Bromodichloromethane	5	U	5	U	3600	U	7300	U	6	U
1,2-Dichloropropane	5	U	5	U	3600	U	7300	U	6	U
cis-1,3-Dichloropropene	5	U	5	U	3600	U	7300	U	6	U
Trichloroethene	5	U	5	U	3600	U	7300	U	6	U
Benzene	5	U	5	U	2600	J	7300	U	6	U
Dibromochloromethane	5	U	5	U	3600	U	7300	U	6	U
1,1,2-Trichloroethane	5	U	5	U	3600	U	7300	U	6	U
trans-1,3-Dichloropropene	5	U	5	U	3600	U	7300	U	6	U
2-Chloroethylvinylether	5	U	5	U	7200	U	15000	U	6	U
Bromoform	5	U	5	U	3600	U	7300	U	6	U
2-Hexanone	52	U	54	U	36000	U	73000	U	56	U
4-Methyl-2-pentanone	52	U	54	U	36000	U	73000	U	56	U
Tetrachloroethene	5	U	5	U	3600	U	7300	U	6	U
1,1,2,2-Tetrachloroethane	5	U	5	U	3600	U	7300	U	6	U
Toluene	5	U	5	U	76000		140000		6	U
Chlorobenzene	5	U	5	U	3600	U	7300	U	6	U
Ethylbenzene	5	U	5	U	13000		24000		6	U
Styrene	5	U	5	U	3600	U	7300	U	6	U

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-7-SB1(1.5) Concen.	Qualifier	MANG-7-SB2(1) Concen.	Qualifier	MANG-7-SB3(3.5) Concen.	Qualifier	MANG-7-SB3(5.5) Concen.	Qualifier	MANG-7-SB4(5) Concen.	Qualifier
m/p-xylene	5	U	5	U	78000		110000		6	U
o-xylene	5	U	5	U	41000		49000		6	U
1,3-dichlorobenzene	5	U	5	U	3600	U	7300	U	6	U
1,2/1,4-dichlorobenzene	5	U	5	U	3600	U	7300	U	6	U
GC/MS Semivolatile Organics (µg/kg)										
N-Nitroso-dimethylamine	340	U	360	U	3800	U	3800	U	370	U
Phenol	340	U	360	U	3800	U	3800	U	370	U
Bis(2-chloroethyl)ether	340	U	360	U	3800	U	3800	U	370	U
2-Chlorophenol	340	U	360	U	3800	U	3800	U	370	U
1,3-Dichlorobenzene	340	U	360	U	3800	U	3800	U	370	U
1,4-Dichlorobenzene	340	U	360	U	3800	U	3800	U	370	U
Benzylalcohol	340	U	360	U	3800	U	3800	U	370	U
1,2-Dichlorobenzene	340	U	360	U	3800	U	3800	U	370	U
2-Methylphenol	340	U	360	U	3800	U	3800	U	370	U
Bis(2-chloroisopropyl)ether	340	U	360	U	3800	U	3800	U	370	U
4-Methylphenol	340	U	360	U	3800	U	3800	U	370	U
N-Nitroso-di-n-propylamine	340	U	360	U	3800	U	3800	U	370	U
Hexachloroethane	340	U	360	U	3800	U	3800	U	370	U
Nitrobenzene	340	U	360	U	3800	U	3800	U	370	U
Isophorone	340	U	360	U	3800	U	3800	U	370	U
2-Nitrophenol	340	U	360	U	3800	U	3800	U	370	U
2,4-Dimethylphenol	340	U	360	U	3800	U	3800	U	370	U
Bis(2-chloroethoxy)methane	340	U	360	U	3800	U	3800	U	370	U
2,4-Dichlorophenol	340	U	360	U	3800	U	3800	U	370	U
Benzoic acid	1700	U	1700	U	18000	U	19000	U	1800	U
1,2,4-Trichlorobenzene	340	U	360	U	3800	U	3800	U	370	U
Naphthalene	340	U	360	U	22000		13000		370	U
4-Chloroaniline	340	U	360	U	3800	U	3800	U	370	U
Hexachlorobutadiene	340	U	360	U	3800	U	38[illegible]	U	370	U
4-Chloro-3-methylphenol	340	U	360	U	3800	U	3800	U	370	U
2-Methylnaphthalene	340	U	360	U	42000		27000		370	U
Hexachlorocyclopentadiene	340	U	360	U	3800	U	3[illegible]	U	370	U
2,4,6-Trichlorophenol	340	U	360	U	3800	U	3800	U	370	U
2,4,5-Trichlorophenol	1700	U	1700	U	18000	U	19000	U	1800	U
2-Chloronaphthalene	340	U	360	U	3300	U	3800	U	370	U
2-Nitroaniline	340	U	360	U	3800	U	3800	U	370	U
Dimethylphthalate	340	U	360	U	3800	U	3800	U	370	U

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-7-SB1(1.5) Concen.	MANG-7-SB1(1.5) Qualifier	MANG-7-SB2(1) Concen.	MANG-7-SB2(1) Qualifier	MANG-7-SB3(3.5) Concen.	MANG-7-SB3(3.5) Qualifier	MANG-7-SB3(5.5) Concen.	MANG-7-SB3(5.5) Qualifier	MANG-7-SB4(5) Concen.	MANG-7-SB4(5) Qualifier
Acenaphthylene	340	U	360	U	3800	U	3800	U	370	U
2,6-Dinitrotoluene	340	U	360	U	3800	U	3800	U	370	U
3-Nitroaniline	1700	U	1700	U	18000	U	19000	U	1800	U
Acenaphthene	340	U	360	U	3800	U	3800	U	370	U
2,4-Dinitrophenol	1700	U	1700	U	18000	U	19000	U	1800	U
Dibenzofuran	340	U	360	U	3800	U	3800	U	370	U
4-Nitrophenol	1700	U	1700	U	18000	U	19000	U	1800	U
2,4-Dinitrotoluene	340	U	360	U	3800	U	3800	U	370	U
Fluorene	340	U	360	U	3800	U	3800	U	370	U
Diethylphthalate	340	U	360	U	3800	U	3800	U	370	U
4-Chlorophenylphenylether	340	U	360	U	3800	U	3800	U	370	U
4-Nitroaniline	1700	U	1700	U	18000	U	19000	U	1800	U
4,6-Dinitro-2-methylphenol	1700	U	1700	U	18000	U	19000	U	1800	U
N-Nitrosodiphenylamine	340	U	360	U	3800	U	3800	U	370	U
4-Bromophenylphenylether	340	U	360	U	3800	U	3800	U	370	U
Hexachlorobenzene	340	U	360	U	3800	U	3800	U	370	U
Pentachlorophenol	1700	U	1700	U	18000	U	19000	U	1800	U
Phenanthrene	340	U	360	U	3800	U	3800	U	370	U
Anthracene	340	U	360	U	3800	U	3800	U	370	U
Di-n-butylphthalate	340	U	360	U	3800	U	3800	U	140	J
Fluoroanthene	340	U	360	U	3800	U	3800	U	370	U
Pyrene	340	U	360	U	3800	U	3800	U	370	U
Butylbenzylphthalate	340	U	360	U	3800	U	3800	U	370	U
Benzo(a)anthracene	340	U	360	U	3800	U	3800	U	370	U
3,3'-Dichlorobenzidine	690	U	720	U	7600	U	7700	U	740	U
Chrysene	340	U	360	U	3800	U	3800	U	370	U
Bis(2-ethylhexyl)phthalate	340	U	360	U	5400		2800	J	370	U
Di-n-octylphthalate	340	U	360	U	3800	U	3800	U	370	U
Benzo(b)fluoranthene	340	U	360	U	3800	U	3800	U	370	U
Benzo(k)fluoranthene	340	U	360	U	3800	U	3800	U	370	U
Benzo(a)pyrene	340	U	360	U	3800	U	3800	U	370	U
Indeno(1,2,3-cd)pyrene	340	U	360	U	3800	U	3800	U	370	U
Dibenzo(a,h)anthracene	340	U	360	U	3800	U	3800	U	370	U
Benzo(g,h,i)perylene	340	U	360	U	3800	U	3800	U	370	U
Metals (mg/kg)										
Arsenic	2.7		4.5		4.6		5.8		6.2	
Barium	250		178		257		253		111	

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-7-SB1(1.5) Concen.	Qualifier	MANG-7-SB2(1) Concen.	Qualifier	MANG-7-SB3(3.5) Concen.	Qualifier	MANG-7-SB3(5.5) Concen.	Qualifier	MANG-7-SB4(5) Concen.	Qualifier
Cadmium	0.33	U	0.34	U	0.44	U	0.36	U	0.43	U
Chromium	9.7		16.5		15.7		12.3		7.9	
Copper	19		15.3		17	*	17	*	17.1	*
Lead	8	N	10.7	N	443		167		9.9	
Mercury	0.04	U	0.035	U	0.048	UN	0.043	UN	0.056	UN
Nickel	5.7	U	10.1		10.5		7.8		7.3	U
Selenium	0.3	U	0.27	U	0.6	B	0.42	BW	0.37	B
Silver	1.4	U	1.4	U	1.8	U	1.5	U	1.8	U
Zinc	30.4	*	43.2	*	158	*	116	*	39.6	*
Total Petroleum Hydrocarbons (mg/kg)	34		17		19000		14000		44	

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-8-SB1(1.5) Concen.	Qualifier	MANG-8-SB1(1.5)-D Concen.	Qualifier	MANG-8-SB2(3) Concen.	Qualifier	MANG-8-SB3(3) Concen.	Qualifier	MANG-8-SB4(1.5) Concen.	Qualifier	MANG-8-SB4(5.5) Concen.	Qualifier	MANG-8-SB5(1) Concen.	Qualifier	MANG-8-SB5(5.5) Concen.	Qualifier
GC/MS Volatile Organics (µg/kg)																
Chloromethane	11	U	11	U	11	U	11	UJ	11	U	10	U	11	U	11	U
Bromomethane	11	U	11	U	11	U	11	UJ	11	U	10	U	11	U	11	U
Vinyl chloride	11	U	11	U	11	U	11	UJ	11	U	10	U	11	U	11	U
Chloroethane	11	U	11	U	11	U	11	UJ	11	U	10	U	11	U	11	U
Methylene Chloride	16	UB	34	UB	18	UB	24	UBJ	25	UB	12	UB	16	UB	14	UB
Acrolein	11	U	11	U	11	U	11	UJ	11	U	10	U	11	U	11	U
Acetone	95	J	56	J	140		110	UJ	110	U	120		110	U	24	J
Acrylonitrile	11	U	11	U	11	U	11	UJ	11	U	10	U	11	U	11	U
Carbon disulfide	11	U	11	U	11	U	11	UJ	11	U	10	U	11	U	11	U
Trichlorofluoromethane	11	U	11	U	11	U	11	UJ	11	U	10	U	11	U	11	U
1,1-Dichloroethene	6	U	6	U	6	U	5	UJ	6	U	5	U	5	U	6	U
1,1-Dichloroethane	6	U	6	U	6	U	5	UJ	6	U	5	U	5	U	6	U
trans-1,2-Dichloroethene	6	U	8		6	U	5	UJ	6	U	5	U	5	U	6	U
Chloroform	6	U	6	U	6	U	5	UJ	6	U	5	U	5	U	6	U
1,2-Dichloroethane	6	U	6	U	6	U	5	UJ	6	U	5	U	5	U	6	U
2-Butanone	110	U	110	U	110	U	110	UJ	110	U	100	U	110	U	110	U
1,1,1-Trichloroethane	6	U	6	U	6	U	5	UJ	6	U	5	U	5	U	6	U
Carbon tetrachloride	6	U	6	U	6	U	5	UJ	6	U	5	U	5	U	6	U
Vinylacetate	57	U	57	U	57	U	54	UJ	55	U	52	U	54	U	55	U
Bromodichloromethane	6	U	6	U	6	U	5	UJ	6	U	5	U	5	U	6	U
1,2-Dichloropropane	6	U	6	U	6	U	5	UJ	6	U	5	U	5	U	6	U
cis-1,3-Dichloropropene	6	U	6	U	6	U	5	UJ	6	U	5	U	5	U	6	U
Trichloroethene	6	U	6	U	6	U	4	J	260		5	U	5	U	6	U
Benzene	6	U	6	U	6	U	5	UJ	6	U	5	U	5	U	6	U
Dibromochloromethane	6	U	6	U	6	U	5	UJ	6	U	5	U	5	U	6	U
1,1,2-Trichloroethane	6	U	6	U	6	U	5	UJ	6	U	5	U	5	U	6	U
trans-1,3-Dichloropropene	6	U	6	U	6	U	5	UJ	6	U	5	U	5	U	6	U
2-Chloroethylvinylether	11	U	11	U	11	U	11	UJ	11	U	10	U	11	U	11	U
Bromoform	6	U	6	U	6	U	5	UJ	6	U	5	U	5	U	6	U
2-Hexanone	57	U	57	U	57	U	54	UJ	55	U	52	U	54	U	55	U
4-Methyl-2-pentanone	57	U	57	U	57	U	54	UJ	55	U	52	U	54	U	55	U
Tetrachloroethene	6	U	6	U	6	U	5	UJ	6	U	5	U	5	U	6	U
1,1,2,2-Tetrachloroethane	6	U	6	U	6	U	5	UJ	6	U	5	U	5	U	6	U
Toluene	29		[illegible]		6	U	5	UJ	6		5	U	5	U	6	U
Chlorobenzene	6	U	6	U	6	U	5	UJ	35		5	U	5	U	6	U
Ethylbenzene	6	U	8		6	U	5	UJ	6	U	5	U	5	U	6	U
Styrene	6	U	6	U	6	U	5	UJ	6	U	5	U	5	U	6	U

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-8-SB1(1.5) Concen.	Qualifier	MANG-8-SB1(1.5)-D Concen.	Qualifier	MANG-8-SB2(3) Concen.	Qualifier	MANG-8-SB3(3) Concen.	Qualifier	MANG-8-SB4(1.5) Concen.	Qualifier	MANG-8-SB4(5.5) Concen.	Qualifier	MANG-8-SB5(1) Concen.	Qualifier	MANG-8-SB5(5.5) Concen.	Qualifier
m/p-xylene	11		14		6	U	5	UJ	6	U	5	U	5	U	6	U
o-xylene	10		9		6	U	5	UJ	6	U	5	U	5	U	6	U
1,3-dichlorobenzene	6	U	6	U	6	U	5	UJ	6	U	5	U	5	U	6	U
1,2/1,4-dichlorobenzene	6	U	6	U	6	U	5	UJ	180		5	U	5	U	6	U
GC/MS Semivolatile Organics (μg/kg)																
N-Nitroso-dimethylamine	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Phenol	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Bis(2-chloroethyl)ether	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
2-Chlorophenol	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
1,3-Dichlorobenzene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
1,4-Dichlorobenzene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Benzylalcohol	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
1,2-Dichlorobenzene	3800	U	1900	UJ	3800	U	360	U	240	J	340	U	360	U	360	U
2-Methylphenol	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Bis(2-chloroisopropyl)ether	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
4-Methylphenol	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
N-Nitroso-di-n-propylamine	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Hexachloroethane	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Nitrobenzene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Isophorone	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
2-Nitrophenol	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
2,4-Dimethylphenol	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Bis(2-chloroethoxy)methane	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
2,4-Dichlorophenol	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Benzoic acid	18000	U	9100	UJ	18000	U	1700	U	1800	U	1700	U	1700	U	1800	U
1,2,4-Trichlorobenzene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Naphthalene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
4-Chloroaniline	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Hexachlorobutadiene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
4-Chloro-3-methylphenol	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
2-Methylnaphthalene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Hexachlorocyclopentadiene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
2,4,6-Trichlorophenol	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
2,4,5-Trichlorophenol	18000	U	9100	UJ	18000	U	1700	U	1800	U	1700	U	1700	U	1800	U
2-Chloronaphthalene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
2-Nitroaniline	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Dimethylphthalate	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-8-SB1(1.5) Concen.	Qualifier	MANG-8-SB1(1.5)-D Concen.	Qualifier	MANG-8-SB2(3) Concen.	Qualifier	MANG-8-SB3(3) Concen.	Qualifier	MANG-8-SB4(1.5) Concen.	Qualifier	MANG-8-SB4(5.5) Concen.	Qualifier	MANG-8-SB5(1) Concen.	Qualifier	MANG-8-SB5(5.5) Concen.	Qualifier
Acenaphthylene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
2,6-Dinitrotoluene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
3-Nitroaniline	18000	U	9100	UJ	18000	U	1700	U	1800	U	1700	U	1700	U	1800	U
Acenaphthene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
2,4-Dinitrophenol	18000	U	9100	UJ	18000	U	1700	U	1800	U	1700	U	1700	U	1800	U
Dibenzofuran	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
4-Nitrophenol	18000	U	9100	UJ	18000	U	1700	U	1800	U	1700	U	1700	U	1800	U
2,4-Dinitrotoluene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Fluorene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Diethylphthalate	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
4-Chlorophenylphenylether	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
4-Nitroaniline	18000	U	9100	UJ	18000	U	1700	U	1800	U	1700	U	1700	U	1800	U
4,6-Dinitro-2-methylphenol	18000	U	9100	UJ	18000	U	1700	U	1800	U	1700	U	1700	U	1800	U
N-Nitrosodiphenylamine	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
4-Bromophenylphenylether	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Hexachlorobenzene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Pentachlorophenol	18000	U	9100	UJ	18000	U	1700	U	1800	U	1700	U	1700	U	1800	U
Phenanthrene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Anthracene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Di-n-butylphthalate	1300	UJB	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Fluoroanthene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Pyrene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Butylbenzylphthalate	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Benzo(a)anthracene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
3,3'-Dichlorobenzidine	7500	U	3800	UJ	7500	U	720	U	730	U	690	U	720	U	730	U
Chrysene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Bis(2-ethylhexyl)phthalate	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Di-n-octylphthalate	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Benzo(b)fluoranthene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Benzo(k)fluoranthene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Benzo(a)pyrene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Indeno(1,2,3-cd)pyrene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Dibenzo(a,h)anthracene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Benzo(g,h,i)perylene	3800	U	1900	UJ	3800	U	360	U	360	U	340	U	360	U	360	U
Metals (mg/kg)																
Arsenic	6.3		7.3		7.1		22.2		7.4		3.2		3.2		3.5	
Barium	182		187		302		119		223		151		73.4		88.5	

Analytical Data Summary
Soil Samples
Great Falls SI

Analysis	MANG-8-SB1(1.5)		MANG-8-SB1(1.5)-D		MANG-8-SB2(3)		MANG-8-SB3(3)		MANG-8-SB4(1.5)		MANG-8-SB4(5.5)		MANG-8-SB5(1)		MANG-8-SB5(5.5)	
	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier
Cadmium	0.42	U	0.41	U	0.42	U	0.36	U	0.41	U	0.38	U	0.4	U	0.42	U
Chromium	9.4		14.6		12.5		10.5		14		15.6		8.9		12.6	
Copper	12.6		14.2		17.2		6		19.8		7.4		5.2		6.3	
Lead	11.4	N	12.9	N	13.7	N	12.3	N	14.9	N	7.5	N	7.4	N	8.9	N
Mercury	0.052	U	0.054	U	0.037	U	0.042	U	0.039	U	0.04	U	0.045	U	0.042	U
Nickel	7.5	B	7.6	B	8.5		6.2	U	7.1	U	7.8		6.9	U	7.2	U
Selenium	0.31	U	0.34	U	0.34	U	0.32	B	0.32	U	0.35	B	0.26	U	0.3	U
Silver	1.7	U	1.7	U	1.7	U	1.5	U	1.7	U	1.6	U	1.6	U	1.7	U
Zinc	39.2	*	45.4	*	46.3	*	20.2	*	48.3	*	37.7	*	26	*	42.9	*
Total Petroleum Hydrocarbons (mg/kg)	140		22		26		ND		ND		ND		ND		ND	

Analytical Data Summary
Water Samples
Great Falls SI

Analysis	MANG-BG-MW1 fall Concen.	MANG-BG-MW1 fall Qualifier	MANG-BG-MW1 sprg Concen.	MANG-BG-MW1 sprg Qualifier	MANG-1-MW1 fall Concen.	MANG-1-MW1 fall Qualifier	MANG-1-MW1 sprg. Concen.	MANG-1-MW1 sprg. Qualifier	MANG-2-MW1 fall Concen.	MANG-2-MW1 fall Qualifier	MANG-2-MW1 sprg Concen.	MANG-2-MW1 sprg Qualifier	MANG-2-MW1-D sprg. Concen.	MANG-2-MW1-D sprg. Qualifier	MANG-3-MW1 fall Concen.	MANG-3-MW1 fall Qualifier
GC/MS Semivolatile Organics (µg/L)																
N-Nitroso-dimethylamine	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Phenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Bis(2-chloroethyl)ether	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2-Chlorophenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
1,3-Dichlorobenzene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
1,4-Dichlorobenzene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Benzylalcohol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
1,2-Dichlorobenzene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2-Methylphenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Bis(2-chloroisopropyl)ether	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4-Methylphenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
N-Nitroso-di-n-propylamine	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Hexachloroethane	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Nitrobenzene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Isophorone	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2-Nitrophenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2,4-Dimethylphenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Bis(2-chloroethoxy)methane	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2,4-Dichlorophenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Benzoic acid	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U
1,2,4-Trichlorobenzene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Naphthalene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4-Chloroaniline	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Hexachlorobutadiene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4-Chloro-3-methylphenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2-Methylnaphthalene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Hexachlorocyclopentadiene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2,4,6-Trichlorophenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2,4,5-Trichlorophenol	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U
2-Chloronaphthalene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2-Nitroaniline	100	U	100	U	20	U	20	U	100	U	100	U	100	U	100	U
Dimethylphthalate	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Acenaphthylene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2,6-Dinitrotoluene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
3-Nitroaniline	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U
Acenaphthene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2,4-Dinitrophenol	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U

Analytical Data Summary
Water Samples
Great Falls SI

Analysis	MANG-BG-MW1 fall Concen.	MANG-BG-MW1 fall Qualifier	MANG-BG-MW1 sprg Concen.	MANG-BG-MW1 sprg Qualifier	MANG-1-MW1 fall Concen.	MANG-1-MW1 fall Qualifier	MANG-1-MW1 sprg. Concen.	MANG-1-MW1 sprg. Qualifier	MANG-2-MW1 fall Concen.	MANG-2-MW1 fall Qualifier	MANG-2-MW1 sprg. Concen.	MANG-2-MW1 sprg. Qualifier	MANG-2-MW1-D sprg. Concen.	MANG-2-MW1-D sprg. Qualifier	MANG-3-MW1 fall Concen.	MANG-3-MW1 fall Qualifier
Dibenzofuran	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4-Nitrophenol	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U
2,4-Dinitrotoluene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Fluorene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Diethylphthalate	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4-Chlorophenylphenylether	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4-Nitroaniline	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U
4,6-Dinitro-2-methylphenol	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U
N-Nitrosodiphenylamine	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4-Bromophenylphenylether	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Hexachlorobenzene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Pentachlorophenol	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U
Phenanthrene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Anthracene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Di-n-butylphthalate	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Fluoroanthene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Pyrene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Butylbenzylphthalate	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Benzo(a)anthracene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
3,3'-Dichlorobenzidine	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U
Chrysene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Bis(2-ethylhexyl)phthalate	20	U	20	U	20	U	62		20	U	13	J	4	J	20	U
Di-n-octylphthalate	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Benzo(b)fluoranthene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Benzo(k)fluoranthene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Benzo(a)pyrene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Indeno(1,2,3-cd)pyrene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Dibenzo(a,h)anthracene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Benzo(g,h,i)perylene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Metals (µg/L)																
Arsenic	1.0	U	2.2	U	1.0	U	2.2	U	1.0	U	2.2	U	2.5	BW	1.0	U
Barium	5.0	JB	62.2	B	138.0	JB	107.0	B	42.0	B	57.8	BJ	57.8	B	36.0	B
Cadmium	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Chromium	9.1	U	4.0	U	9.1	U	4.0	U	9.1	U	4.0	U	4.0	U	9.1	U
Copper	14.0	B	3.0	U	3.5	U	3.0	U	3.5	U	3.0	U	4.7	B	3.5	U
Lead	4.8	J	4.3	JN	6.4	J	2.5	JBN	4.7	J	4.2	NJ	3.7	NJ	4.9	
Mercury	0.10	U	2.0	U	0.1	U	2.0	U	0.1	U	2.0	U	2.0	U	0.1	U

Analytical Data Summary
Water Samples
Great Falls SI

Analysis	MANG-BG-MWI fall Concen.	MANG-BG-MWI fall Qualifier	MANG-BG-MWI sprg Concen.	MANG-BG-MWI sprg Qualifier	MANG-1-MWI fall Concen.	MANG-1-MWI fall Qualifier	MANG-1-MWI sprg. Concen.	MANG-1-MWI sprg. Qualifier	MANG-2-MWI fall Concen.	MANG-2-MWI fall Qualifier	MANG-2-MWI sprg. Concen.	MANG-2-MWI sprg. Qualifier	MANG-2-MWI-D sprg. Concen.	MANG-2-MWI-D sprg. Qualifier	MANG-3-MWI fall Concen.	MANG-3-MWI fall Qualifier
Nickel	34.2	U	6.0	U	34.2	U	25.0	B	34.2	U	6.0	U	6.0	U	34.2	U
Selenium	1.5	U	2.2	U	4.2	B	8.5	BS	14.2	S	9.7		10.1		1.5	U
Silver	8.2	U	5.0	U	8.2	U	5.0	U	8.2	U	5.0	U	5.0	U	8.2	U
Zinc	131.0	J*	9.8	JB	952	*	527		37	J*	15.0	BJ	12.8	BJ	66.0	*
Total Petroleum Hydrocarbons (mg/L)	1		ND		ND		ND		7		ND		ND		2	
8010 Halogenated Volatile Organics (µg/L)																
Benzyl chloride	5.0	NR	5.0	U	5.0	NR	5.0	U	5.0	NR	5.0	U	5.0	U	5.0	NR
Bromobenzene	5.0	NR	5.0	U	5.0	NR	5.0	U	5.0	NR	5.0	U	5.0	U	5.0	NR
Bromodichloromethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Bromoform	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Bromomethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Carbon tetrachloride	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Chlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Chloroethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Chloroform	1.0	U	1.0	U	1.1	J	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1-Chlorohexane	5.0	NR	5.0	U	5.0	NR	5.0	U	5.0	NR	5.0	U	5.0	U	5.0	NR
2-Chloroethylvinylether	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Chloromethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Chlorotoluene	5.0	NR	5.0	U	5.0	NR	5.0	U	5.0	NR	5.0	U	5.0	U	5.0	NR
Dibromochloromethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Dibromomethane	5.0	NR	5.0	U	5.0	NR	5.0	U	5.0	NR	5.0	U	5.0	U	5.0	NR
1,2-dichlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,3-dichlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,4-dichlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Dichlorodifluoromethane	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U
1,1-Dichloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2-Dichloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1-Dichloroethene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2-Dichloroethene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Dichloromethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,2-Dichloropropane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,3-Dichloropropene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1,2,2-Tetrachloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1,1,2-Tetrachloroethane	5.0	NR	5.0	U	5.0	NR	5.0	U	5.0	NR	5.0	U	5.0	U	5.0	NR
Tetrachloroethene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1,1-Trichloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U

Analysis	MANG-BG-MW1 fall		MANG-BG-MW1 sprg		MANG-1-MW1 fall		MANG-1-MW1 sprg.		MANG-2-MW1 fall		MANG-2-MW1 sprg.		MANG-2-MW1-D sprg.		MANG-3-MW1 fall	
	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier
1,1,2-Trichloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Trichloroethene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Trichlorofluoromethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Trichloropropane	1.0	NR	1.0	U	1.0	NR	1.0	U	1.0	NR	1.0	U	1.0	U	1.0	NR
Vinyl chloride	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
8020 Aromatic Volatile Organics (μg/L)																
Benzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Ethylbenzene	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Toluene	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Xylenes (total)	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
Chlorobenzene	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
1,2-dichlorobenzene	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
1,3-dichlorobenzene	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
1,4-dichlorobenzene	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U

Analytical Data Summary
Water Samples
Great Falls SI

Analysis	MANG-3-MW1 sprg. Concen.	Qualifier	MANG-4-MW1 fall Concen.	Qualifier	MANG-4-MW1A fall Concen.	Qualifier	MANG-4-MW1 sprg. Concen.	Qualifier	MANG-4-MW1A sprg. Concen.	Qualifier	MANG-5-MW1 fall Concen.	Qualifier	MANG-5-MW1 sprg. Concen.	Qualifier	MANG-6-MW1 fall Concen.	Qualifier
GC/MS Semivolatile Organics (µg/L)																
N-Nitroso-dimethylamine	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Phenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Bis(2-chloroethyl)ether	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2-Chlorophenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
1,3-Dichlorobenzene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
1,4-Dichlorobenzene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Benzylalcohol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
1,2-Dichlorobenzene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2-Methylphenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Bis(2-chloroisopropyl)ether	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4-Methylphenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
N-Nitroso-di-n-propylamine	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Hexachloroethane	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Nitrobenzene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Isophorone	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2-Nitrophenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2,4-Dimethylphenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Bis(2-chloroethoxy)methane	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2,4-Dichlorophenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Benzoic acid	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U
1,2,4-Trichlorobenzene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Naphthalene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4-Chloroaniline	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Hexachlorobutadiene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4-Chloro-3-methylphenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2-Methylnaphthalene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Hexachlorocyclopentadiene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2,4,6-Trichlorophenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2,4,5-Trichlorophenol	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U
2-Chloronaphthalene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2-Nitroaniline	100	U	100	U	100	U	100	U	100	U	20	U	20	U	20	U
Dimethylphthalate	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Acenaphthylene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2,6-Dinitrotoluene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
3-Nitroaniline	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U
Acenaphthene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2,4-Dinitrophenol	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U

Analytical Data Summary
Water Samples
Great Falls SI

Analysis	MANG-3-MW1 sprg. Concen.	Qualifier	MANG-4-MW1 fall Concen.	Qualifier	MANG-4-MW1A fall Concen.	Qualifier	MANG-4-MW1 sprg. Concen.	Qualifier	MANG-4-MW1A sprg. Concen.	Qualifier	MANG-5-MW1 fall Concen.	Qualifier	MANG-5-MW1 sprg. Concen.	Qualifier	MANG-6-MW1 fall Concen.	Qualifier
Dibenzofuran	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4-Nitrophenol	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U
2,4-Dinitrotoluene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Fluorene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Diethylphthalate	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4-Chlorophenylphenylether	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4-Nitroaniline	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U
4,6-Dinitro-2-methylphenol	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U
N-Nitrosodiphenylamine	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4-Bromophenylphenylether	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Hexachlorobenzene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Pentachlorophenol	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U
Phenanthrene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Anthracene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Di-n-butylphthalate	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Fluoroanthene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Pyrene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Butylbenzylphthalate	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Benzo(a)anthracene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
3,3'-Dichlorobenzidine	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U
Chrysene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Bis(2-ethylhexyl)phthalate	20	U	20	U	20	U	7	J	20	U	20	U	20	U	6	J
Di-n-octylphthalate	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Benzo(b)fluoranthene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Benzo(k)fluoranthene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Benzo(a)pyrene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Indeno(1,2,3-cd)pyrene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Dibenzo(a,h)anthracene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Benzo(g,h,i)perylene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Metals (µg/L)																
Arsenic	2.2	U	1.0	U	1.0	U	2.2	UW	2.2	U	1.0	U	2.2	U	1.0	U
Barium	44.2	B	52.0	BJ	259.0		55.4	B	288.0		46.0	B	44.9	B	212.0	J
Cadmium	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Chromium	4.0	U	9.1	U	9.1	U	4.0	U	4.0	U	9.1	U	4.0	U	9.1	U
Copper	3.0	U	3.5	U	3.5	U	3.0	U	3.0	U	3.5	U	3.0	U	6.0	JB
Lead	3.3	N	7.5	J	5.6	J	3.7	NJ	3.9	NJ	4.6		4.2	N	6.3	J
Mercury	2.0	U	0.1	U	0.1	U	2.0	U	2.0	U	0.1	U	2.0	U	0.19	B

Analytical Data Summary
Water Samples
Great Falls SI

Analysis	MANG-3-MW1 sprg. Concen	MANG-3-MW1 sprg. Qualifier	MANG-4-MW1 fall Concen.	MANG-4-MW1 fall Qualifier	MANG-4-MW1A fall Concen.	MANG-4-MW1A fall Qualifier	MANG-4-MW1 sprg. Concen.	MANG-4-MW1 sprg. Qualifier	MANG-4-MW1A sprg. Concen.	MANG-4-MW1A sprg. Qualifier	MANG-5-MW1 fall Concen.	MANG-5-MW1 fall Qualifier	MANG-5-MW1 sprg. Concen.	MANG-5-MW1 sprg. Qualifier	MANG-6-MW1 fall Concen.	MANG-6-MW1 fall Qualifier
Nickel	6.0	U	34.2	U	34.2	U	6.0	U	6.0	U	34.2	U	6.0	U	34.2	U
Selenium	2.2	U	10.8	S	1.5		8.4		2.2	U	8.1		3.5	BW	1.5	U
Silver	5.0	U	8.2	U	8.2	U	5.0	U	5.0	U	8.2	U	5.0	U	8.2	U
Zinc	10.4	B	32.0	J*	12.0	JB*	11.3	JB	8.1	JB	51.0	*	13.4	B	52.0	J*
Total Petroleum Hydrocarbons (mg/L)	ND		3		ND		ND		ND		4		ND		ND	
8010 Halogenated Volatile Organics (µg/L)																
Benzyl chloride	5.0	U	5.0	NR	5.0	NR	5.0	U	5.0	U	5.0	NR	5.0	U	5.0	NR
Bromobenzene	5.0	U	5.0	NR	5.0	NR	5.0	U	5.0	U	5.0	NR	5.0	U	5.0	NR
Bromodichloromethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Bromoform	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Bromomethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Carbon tetrachloride	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Chlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Chloroethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Chloroform	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1-Chlorohexane	5.0	U	5.0	NR	5.0	NR	5.0	U	5.0	U	5.0	NR	5.0	U	5.0	NR
2-Chloroethylvinylether	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Chloromethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Chlorotoluene	5.0	U	5.0	NR	5.0	NR	5.0	U	5.0	U	5.0	NR	5.0	U	5.0	NR
Dibromochloromethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Dibromomethane	5.0	U	5.0	NR	5.0	NR	5.0	U	5.0	U	5.0	NR	5.0	U	5.0	NR
1,2-dichlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,3-dichlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,4-dichlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Dichlorodifluoromethane	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U
1,1-Dichloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2-Dichloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1-Dichloroethene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2-Dichloroethene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Dichloromethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,2-Dichloropropane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,3-Dichloropropene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1,2,2-Tetrachloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1,1,2-Tetrachloroethane	5.0	U	5.0	NR	5.0	NR	5.0	U	5.0	U	5.0	NR	5.0	U	5.0	NR
Tetrachloroethene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1,1-Trichloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U

Analytical Data Summary
Water Samples
Great Falls SI

Analysis	MANG-3-MW1 sprg.		MANG-4-MW1 fall		MANG-4-MW1A fall		MANG-4-MW1 sprg.		MANG-4-MW1A sprg.		MANG-5-MW1 fall		MANG-5-MW1 sprg.		MANG-6-MW1 fall	
	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier
1,1,2-Trichloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Trichloroethene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Trichlorofluoromethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Trichloropropane	1.0	U	1.0	NR	1.0	NR	1.0	U	1.0	U	1.0	NR	1.0	U	1.0	NR
Vinyl chloride	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
8020 Aromatic Volatile Organics (μg/L)																
Benzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.8	
Ethylbenzene	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Toluene	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Xylenes (total)	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
Chlorobenzene	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
1,2-dichlorobenzene	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
1,3-dichlorobenzene	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
1,4-dichlorobenzene	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U

Analytical Data Summary
Water Samples
Great Falls SI

Analysis	MANG-6-MW1-D fall Concen.	MANG-6-MW1-D fall Qualifier	MANG-6-MW1 sprg. Concen.	MANG-6-MW1 sprg. Qualifier	MANG-6-MW1D sprg. Concen.	MANG-6-MW1D sprg. Qualifier	MANG-7-MW1 fall Concen.	MANG-7-MW1 fall Qualifier	MANG-7-MW1 sprg. Concen.	MANG-7-MW1 sprg. Qualifier	MANG-8-MW1 fall Concen.	MANG-8-MW1 fall Qualifier	MANG-8-MW1 sprg. Concen.	MANG-8-MW1 sprg. Qualifier
GC/MS Semivolatile Organics (µg/L)														
N-Nitroso-dimethylamine	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Phenol	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Bis(2-chloroethyl)ether	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
2-Chlorophenol	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
1,3-Dichlorobenzene	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
1,4-Dichlorobenzene	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Benzylalcohol	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
1,2-Dichlorobenzene	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
2-Methylphenol	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Bis(2-chloroisopropyl)ether	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
4-Methylphenol	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
N-Nitroso-di-n-propylamine	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Hexachloroethane	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Nitrobenzene	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Isophorone	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
2-Nitrophenol	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
2,4-Dimethylphenol	20	U	20	UJ	20	U	20	U	2	J	20	U	20	U
Bis(2-chloroethoxy)methane	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
2,4-Dichlorophenol	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Benzoic acid	100	U	100	UJ	100	U	100	U	100	U	100	U	100	U
1,2,4-Trichlorobenzene	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Naphthalene	20	U	20	UJ	20	U	24		20	U	20	U	20	U
4-Chloroaniline	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Hexachlorobutadiene	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
4-Chloro-3-methylphenol	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
2-Methylnaphthalene	20	U	20	UJ	20	U	11	J	20	U	20	U	20	U
Hexachlorocyclopentadiene	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
2,4,6-Trichlorophenol	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
2,4,5-Trichlorophenol	100	U	100	UJ	100	U	100	U	100	U	100	U	100	U
2-Chloronaphthalene	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
2-Nitroaniline	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Dimethylphthalate	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Acenaphthylene	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
2,6-Dinitrotoluene	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
3-Nitroaniline	100	U	100	UJ	100	U	100	U	100	U	100	U	100	U
Acenaphthene	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
2,4-Dinitrophenol	100	U	100	UJ	100	U	100	U	100	U	100	U	100	U

Analytical Data Summary
Water Samples
Great Falls SI

Analysis	MANG-6-MW1-D fall Concen.	MANG-6-MW1-D fall Qualifier	MANG-6-MW1 sprg. Concen.	MANG-6-MW1 sprg. Qualifier	MANG-6-MW1D sprg. Concen.	MANG-6-MW1D sprg. Qualifier	MANG-7-MW1 fall Concen.	MANG-7-MW1 fall Qualifier	MANG-7-MW1 sprg. Concen.	MANG-7-MW1 sprg. Qualifier	MANG-8-MW1 fall Concen.	MANG-8-MW1 fall Qualifier	MANG-8-MW1 sprg. Concen.	MANG-8-MW1 sprg. Qualifier
Dibenzofuran	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
4-Nitrophenol	100	U	100	UJ	100	U	100	U	100	U	100	U	100	U
2,4-Dinitrotoluene	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Fluorene	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Diethylphthalate	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
4-Chlorophenylphenylether	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
4-Nitroaniline	100	U	100	UJ	100	U	100	U	100	U	100	U	100	U
4,6-Dinitro-2-methylphenol	100	U	100	UJ	100	U	100	U	100	U	100	U	100	U
N-Nitrosodiphenylamine	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
4-Bromophenylphenylether	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Hexachlorobenzene	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Pentachlorophenol	100	U	100	UJ	100	U	100	U	100	U	100	U	100	U
Phenanthrene	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Anthracene	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Di-n-butylphthalate	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Fluoroanthene	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Pyrene	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Butylbenzylphthalate	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Benzo(a)anthracene	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
3,3'-Dichlorobenzidine	40	U	40	UJ	40	U	40	U	40	U	40	U	40	U
Chrysene	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Bis(2-ethylhexyl)phthalate	21		20	UJ	20	U	6	J	20	U	7	J	20	U
Di-n-octylphthalate	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Benzo(b)fluoranthene	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Benzo(k)fluoranthene	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Benzo(a)pyrene	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Indeno(1,2,3-cd)pyrene	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Dibenzo(a,h)anthracene	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Benzo(g,h,i)perylene	20	U	20	UJ	20	U	20	U	20	U	20	U	20	U
Metals (μg/L)														
Arsenic	1.5	JB	2.2	U	2.2	U	1.5	JB	2.2	U	1.0	U	2.2	U
Barium	215.0	J	248.0		250.0		95.0	JB	145.0	B	70.0	JB	51.2	B
Cadmium	2.0	U	2.7	B	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Chromium	9.1	U	4.0	U	4.0	U	9.1	U	4.0	U	9.1	U	4.0	U
Copper	3.5	U	3.0	U	3.0	U	3.5	U	3.0	U	3.5	U	3.0	U
Lead	3.8	J	4.2	NJ	4.2	NJ	6.3	J	4.3	JN	5.8	J	4.3	JN
Mercury	0.10	U	2.0	U	2.0	U	0.10	U	2.0	U	0.10	U	2.0	U

Analytical Data Summary
Water Samples
Great Falls SI

Analysis	MANG-6-MW1-D fall Concen.	Qualifier	MANG-6-MW1 sprg. Concen.	Qualifier	MANG-6-MW1D sprg. Concen.	Qualifier	MANG-7-MW1 fall Concen.	Qualifier	MANG-7-MW1 sprg. Concen.	Qualifier	MANG-8-MW1 fall Concen.	Qualifier	MANG-8-MW1 sprg. Concen.	Qualifier
Nickel	34.2	U	6.0	U	6.0	U	34.2	U	6.0	U	34.2	U	6.0	U
Selenium	1.5	U	2.2	U	2.2	U	1.5	U	2.2	UW	1.5	U	2.2	U
Silver	8.2	U	5.0	U	5.0	U	8.2	U	5.0	U	8.2	U	5.0	U
Zinc	15.0	JB*	9.4	JB	6.0	UJ	30.0	J*	14.0	JB	11.0	JB*	9.4	JB
Total Petroleum Hydrocarbons (mg/L)	ND		ND		ND		ND		ND		3		ND	
8010 Halogenated Volatile Organics (µg/L)														
Benzyl chloride	5.0	NR	5.0	U	5.0	U	25.0	NR	5.0	U	5.0	NR	5.0	U
Bromobenzene	5.0	NR	5.0	U	5.0	U	25.0	NR	5.0	U	5.0	NR	5.0	U
Bromodichloromethane	1.0	U	1.0	U	1.0	U	5.0	U	1.0	U	1.0	U	1.0	U
Bromoform	2.0	U	2.0	U	2.0	U	10.0	U	2.0	U	2.0	U	2.0	U
Bromomethane	5.0	U	5.0	U	5.0	U	25.0	U	5.0	U	5.0	U	5.0	U
Carbon tetrachloride	1.0	U	1.0	U	1.0	U	5.0	U	1.0	U	1.0	U	1.0	U
Chlorobenzene	1.0	U	1.0	U	1.0	U	5.0	U	1.0	U	1.0	U	1.0	U
Chloroethane	5.0	U	5.0	U	5.0	U	25.0	U	5.0	U	5.0	U	5.0	U
Chloroform	1.0	U	1.0	U	1.0	U	5.0	U	1.0	U	1.0	U	2.3	J
1-Chlorohexane	5.0	NR	5.0	U	5.0	U	25.0	NR	5.0	U	5.0	NR	5.0	U
2-Chloroethylvinylether	2.0	U	2.0	U	2.0	U	10.0	U	2.0	U	2.0	U	2.0	U
Chloromethane	5.0	U	5.0	U	5.0	U	25.0	U	5.0	U	5.0	U	5.0	U
Chlorotoluene	5.0	NR	5.0	U	5.0	U	25.0	NR	5.0	U	5.0	NR	5.0	U
Dibromochloromethane	1.0	U	1.0	U	1.0	U	5.0	U	1.0	U	1.0	U	1.0	U
Dibromomethane	5.0	NR	5.0	U	5.0	U	25.0	NR	5.0	U	5.0	NR	5.0	U
1,2-dichlorobenzene	1.0	U	1.0	U	1.0	U	5.0	U	1.0	U	1.0	U	1.0	U
1,3-dichlorobenzene	1.0	U	1.0	U	1.0	U	5.0	U	1.0	U	1.0	U	1.0	U
1,4-dichlorobenzene	1.0	U	1.0	U	1.0	U	5.0	U	1.0	U	1.0	U	1.0	U
Dichlorodifluoromethane	10.0	U	10.0	U	10.0	U	50.0	U	10.0	U	10.0	U	10.0	U
1,1-Dichloroethane	1.0	U	1.0	U	1.0	U	5.0	U	1.0	U	1.0	U	5.0	
1,2-Dichloroethane	1.0	U	1.0	U	1.0	U	5.0	U	1.0	U	1.0	U	1.0	U
1,1-Dichloroethene	1.0	U	1.0	U	1.0	U	5.0	U	1.0	U	1.0	U	1.0	U
1,2-Dichloroethene	1.0	U	1.0	U	1.0	U	5.0	U	1.0	U	48.0		160.0	
Dichloromethane	5.0	U	5.0	U	5.0	U	25.0	U	5.0	U	5.0	U	5.0	U
1,2-Dichloropropane	1.0	U	1.0	U	1.0	U	5.0	U	1.0	U	1.0	U	1.0	U
1,3-Dichloropropene	1.0	U	1.0	U	1.0	U	5.0	U	1.0	U	1.0	U	1.0	U
1,1,2,2-Tetrachloroethane	1.0	U	1.0	U	1.0	U	5.0	U	1.0	U	1.0	U	1.0	U
1,1,1,2-Tetrachloroethane	5.0	NR	5.0	U	5.0	U	25.0	NR	5.0	U	5.0	NR	5.0	U
Tetrachloroethene	1.0	U	1.0	U	1.0	U	5.0	U	1.0	U	2.8		4.5	
1,1,1-Trichloroethane	1.0	U	1.0	U	1.0	U	5.0	U	1.0	U				

Analytical Data Summary
Water Samples
Great Falls SI

Analysis	MANG-6-MW1-D fall Concen.	Qualifier	MANG-6-MW1 sprg. Concen.	Qualifier	MANG-6-MW1D sprg. Concen.	Qualifier	MANG-7-MW1 fall Concen.	Qualifier	MANG-7-MW1 sprg. Concen.	Qualifier	MANG-8-MW1 fall Concen.	Qualifier	MANG-8-MW1 sprg. Concen.	Qualifier
1,1,2-Trichloroethane	1.0	U	1.0	U	1.0	U	5.0	U	1.0	U	1.0	U	6.1	
Trichloroethene	1.0	U	1.0	U	1.0	U	5.0	U	1.0	U	1.0	U	1.0	U
Trichlorofluoromethane	1.0	U	1.0	U	1.0	U	5.0	U	1.0	U	3.5		18.4	
Trichloropropane	1.0	NR	1.0	U	1.0	U	5.0	NR	1.0	U	1.0	U	1.0	U
Vinyl chloride	2.0	U	2.0	U	2.0	U	10.0	U	2.0	U	1.0	NR	1.0	U
											2.0	U	2.0	U
8020 Aromatic Volatile Organics (µg/L)														
Benzene	1.8		6.8		5.9		11.0		4.1					
Ethylbenzene	2.0	U	3.3		3.4		160.0		27.5		1.0	U	1.0	U
Toluene	2.0	U	2.0	U	2.0	U	10.0	U	2.0	U	2.0	U	2.0	U
Xylenes (total)	4.0	U	4.0	U	4.0	U	500.0		240.0		2.0	U	2.0	U
Chlorobenzene	2.0	U	2.0	U	2.0	U	10.0	U	2.0	U	4.0	U	4.0	U
1,2-dichlorobenzene	4.0	U	4.0	U	4.0	U	20.0	U	4.0	U	2.0	U	2.0	U
1,3-dichlorobenzene	4.0	U	4.0	U	4.0	U	20.0	U	4.0	U	4.0	U	4.0	U
1,4-dichlorobenzene	4.0	U	4.0	U	4.0	U	20.0	U	4.0	U	4.0	U	4.0	U
											4.0	U	4.0	U

Analytical Data Summary
QA/QC Samples
Great Falls SI

Analysis	RINSATE 2 Concen.	RINSATE 2 Qualifier	RINSATE 4 Concen.	RINSATE 4 Qualifier	RINSATE 6 Concen.	RINSATE 6 Qualifier	RINSATE 8 Concen.	RINSATE 8 Qualifier	RINSATE 10 Concen.	RINSATE 10 Qualifier	RINSATE 12 Concen.	RINSATE 12 Qualifier	RINSATE 14 Concen.	RINSATE 14 Qualifier	RINSATE 16 Concen.	RINSATE 16 Qualifier	RINSATE 19 Concen.	RINSATE 19 Qualifier
GC/MS Volatile Organics (µg/L)																		
Chloromethane	10	U	10	U	10	U	10	U	10	U	10	U						
Bromomethane	10	U	10	U	10	U	10	U	10	U	10	U						
Vinyl Chloride	10	U	10	U	10	U	10	U	10	U	10	U						
Chloroethane	10	U	10	U	10	U	10	U	10	U	10	U						
Methylene Chloride	33	UB	12	UB	13	UB	15	UB	12	UB	13	UB						
Acrolein	10	U	10	U	10	U	10	U	10	U	10	U						
Acetone	100	U	100	U	100	U	100	U	100	U	19	J						
Acrylonitrile	10	U	10	U	10	U	10	U	10	U	10	U						
Carbon disulfide	10	U	10	U	10	U	10	U	10	U	10	U						
Trichlorofluoromethane	10	U	10	U	10	U	10	U	10	U	10	U						
1,1-Dichloroethene	5	U	5	U	5	U	5	U	5	U	5	U						
1,1-Dichloroethane	5	U	5	U	5	U	5	U	5	U	5	U						
trans-1,2-Dichloroethene	5	U	5	U	5	U	5	U	5	U	5	U						
Chloroform	14		8		9		12		10		10							
1,2-Dichloroethane	5	U	5	U	5	U	5	U	5	U	5	U						
2-Butanone	100	U	100	U	100	U	100	U	100	U	100	U						
1,1,1-Trichloroethane	5	U	5	U	5	U	5	U	5	U	5	U						
Carbon tetrachloride	5	U	5	U	5	U	5	U	5	U	5	U						
Vinyl acetate	50	U	50	U	50	U	50	U	50	U	50	U						
Bromodichloromethane	4	J	5	U	5	U	3	J	3	J	5	U						
1,2-Dichloropropane	5	U	5	U	5	U	5	U	5	U	5	U						
cis-1,3-Dichloropropene	5	U	5	U	5	U	5	U	5	U	5	U						
Trichloroethene	5	U	5	U	5	U	5	U	5	U	5	U						
Benzene	5	U	5	U	5	U	5	U	5	U	5	U						
Dibromochloromethane	5	U	5	U	5	U	5	U	5	U	5	U						
1,1,2-Trichloroethane	5	U	5	U	5	U	5	U	5	U	5	U						
trans-1,3-Dichloropropene	5	U	5	U	5	U	5	U	5	U	5	U						
2-Chloroethylvinylether	10	U	10	U	10	U	10	U	10	U	10	U						
Bromoform	5	U	5	U	5	U	5	U	5	U	5	U						
2-Hexanone	50	U	50	U	50	U	50	U	50	U	50	U						
4-Methyl-2-pentanone	50	U	50	U	50	U	50	U	50	U	50	U						
Tetrachloroethene	5	U	5	U	5	U	5	U	5	U	5	U						
1,1,2,2-Tetrachloroethane	5	U	5	U	5	U	5	U	5	U	5	U						
Toluene	5	U	5	U	5	U	5	U	5	U	5	U						
Chlorobenzene	5	U	5	U	5	U	5	U	5	U	5	U						
Ethylbenzene	5	U	5	U	5	U	5	U	5	U	5	U						

Analytical Data Summary
QA/QC Samples
Great Falls SI

Analysis	RINSATE 2 Concen.	RINSATE 2 Qualifier	RINSATE 4 Concen.	RINSATE 4 Qualifier	RINSATE 6 Concen.	RINSATE 6 Qualifier	RINSATE 8 Concen.	RINSATE 8 Qualifier	RINSATE 10 Concen.	RINSATE 10 Qualifier	RINSATE 12 Concen.	RINSATE 12 Qualifier	RINSATE 14 Concen.	RINSATE 14 Qualifier	RINSATE 16 Concen.	RINSATE 16 Qualifier	RINSATE 19 Concen.	RINSATE 19 Qualifier
Styrene	5	U	5	U	5	U	5	U	5	U	5	U						
m/p-xylene	5	U	5	U	5	U	5	U	5	U	5	U						
o-xylene	5	U	5	U	5	U	5	U	5	U	5	U						
1,3-dichlorobenzene	5	U	5	U	5	U	5	U	5	U	5	U						
1,2/1,4-dichlorobenzene	5	U	5	U	5	U	5	U	5	U	5	U						
GC/MS Semivolatile Organics (μg/L)																		
N-Nitroso-dimethylamine	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Phenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Bis(2-chloroethyl)ether	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2-Chlorophenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
1,3-Dichlorobenzene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
1,4-Dichlorobenzene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Benzylalcohol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
1,2-Dichlorobenzene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2-Methylphenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Bis(2-chloroisopropyl)ether	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4-Methylphenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
N-Nitroso-di-n-propylamine	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Hexachloroethane	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Nitrobenzene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Isophorone	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2-Nitrophenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2,4-Dimethylphenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Bis(2-chloroethoxy)methane	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2,4-Dichlorophenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Benzoic acid	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U
1,2,4-Trichlorobenzene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Naphthalene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4-Chloroaniline	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Hexachlorobutadiene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4-Chloro-3-methylphenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2-Methylnaphthalene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Hexachlorocyclopentadiene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2,4,6-Trichlorophenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2,4,5-Trichlorophenol	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U
2-Chloronaphthalene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U

Analytical Data Summary
QA/QC Samples
Great Falls SI

Analysis	RINSATE 2		RINSATE 4		RINSATE 6		RINSATE 8		RINSATE 10		RINSATE 12		RINSATE 14		RINSATE 16		RINSATE 19	
	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier
2-Nitroaniline	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U
Dimethylphthalate	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Acenaphthylene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2,6-Dinitrotoluene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
3-Nitroaniline	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U
Acenaphthene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2,4-Dinitrophenol	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U
Dibenzofuran	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4-Nitrophenol	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U
2,4-Dinitrotoluene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Fluorene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Diethylphthalate	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4-Chlorophenylphenylether	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4-Nitroaniline	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U
4,6-Dinitro-2-methylphenol	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U
N-Nitrosodiphenylamine	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4-Bromophenylphenylether	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Hexachlorobenzene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Pentachlorophenol	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U
Phenanthrene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Anthracene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Di-n-butylphthalate	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Fluoranthene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Pyrene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Butylbenzylphthalate	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Benzo(a)anthracene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
3,3'-Dichlorobenzidine	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U
Chrysene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Bis(2-ethylhexyl)phthalate	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Di-n-octylphthalate	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Benzo(b)fluoranthene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Benzo(k)fluoranthene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Benzo(a)pyrene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Indeno(1,2,3-cd)pyrene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Dibenzo(a,h)anthracene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Benzo(g,h,i)perylene	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U

Analytical Data Summary
QA/QC Samples
Great Falls SI

Analysis	RINSATE 2 Concen.	RINSATE 2 Qualifier	RINSATE 4 Concen.	RINSATE 4 Qualifier	RINSATE 6 Concen.	RINSATE 6 Qualifier	RINSATE 8 Concen.	RINSATE 8 Qualifier	RINSATE 10 Concen.	RINSATE 10 Qualifier	RINSATE 12 Concen.	RINSATE 12 Qualifier	RINSATE 14 Concen.	RINSATE 14 Qualifier	RINSATE 16 Concen.	RINSATE 16 Qualifier	RINSATE 19 Concen.	RINSATE 19 Qualifier
Metals (µg/L)																		
Arsenic	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2.2	UW
Barium	3.9	U	3.9	U	3.9	U	3.9	U	3.9	U	3.9	U	3.9	U	5.0	B	1.0	U
Cadmium	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Chromium	9.1	U	9.1	U	9.1	U	9.1	U*	9.1	U*	9.1	U	9.1	U	9.1	U	4.0	U
Copper	3.5	U	3.5	U	3.5	U	3.5	U	3.5	U	12.0	BJ	3.5	U	14.0	B	3.0	U
Lead	7.3		5.5	J	30.6		1.5	BJ	2.5	BJ	4.7	J	3.8	J	4.8	J	1.8	BNJ
Mercury	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.17	U	0.1	U	0.1	U	2.0	U
Nickel	34.2	U	34.2	U	34.2	U	34.2	U	34.2	U	34.2	U	34.2	U	34.2	U	6.0	U
Selenium	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	2.2	UW
Silver	8.2	U	8.2	U	8.2	U	8.2	U	8.2	U	8.2	U	8.2	U	8.2	U	5.0	U
Zinc	9.0	B	7.0	B	16.0	B	14.0	B	21.0		163.0		20.0	*	131.0	*	8.1	B
Total Petroleum Hydrocarbons (mg/L)	ND		ND		ND		ND		ND		ND		ND		ND		ND	
8010 Halogenated Volatile Organics (µg/L)																		
Benzyl chloride													5.0	NR	5.0	NR	5.0	U
Bromobenzene													5.0	NR	5.0	NR	5.0	U
Bromodichloromethane													4.4		1.8		1.8	U
Bromoform													2.0	U	2.0	U	2.0	U
Bromomethane													5.0	U	5.0	U	5.0	U
Carbon tetrachloride													1.0	U	1.0	U	1.0	U
Chlorobenzene													1.0	U	1.0	U	1.0	U
Chloroethane													5.0	U	5.0	U	5.0	U
Chloroform													22.0		15.0		7.6	
1-Chlorohexane													5.0	NR	5.0	NR	5.0	U
2-Chloroethylvinylether													2.0	U	2.0	U	2.0	U
Chloromethane													5.0	U	5.0	U	5.0	U
Chlorotoluene													5.0	NR	5.0	NR	5.0	U
Dibromochloromethane													1.0	U	1.0	U	1.0	U
Dibromomethane													5.0	NR	5.0	NR	5.0	U
1,2-dichlorobenzene													1.0	U	1.0	U	1.0	U
1,3-dichlorobenzene													1.0	U	1.0	U	1.0	U
1,4-dichlorobenzene													1.0	U	1.0	U	1.0	U
Dichlorodifluoromethane													10.0	U	10.0	U	10.0	U
1,1-Dichloroethane													1.0	U	1.0	U	1.0	U
1,2-Dichloroethane													1.0	U	1.0	U	1.0	U
1,1-Dichloroethene													1.0	U	1.0	U	1.0	U

Analytical Data Summary
QA/QC Samples
Great Falls SI

Analysis	RINSATE 2 Concen.	RINSATE 2 Qualifier	RINSATE 4 Concen.	RINSATE 4 Qualifier	RINSATE 6 Concen.	RINSATE 6 Qualifier	RINSATE 8 Concen.	RINSATE 8 Qualifier	RINSATE 10 Concen.	RINSATE 10 Qualifier	RINSATE 12 Concen.	RINSATE 12 Qualifier	RINSATE 14 Concen.	RINSATE 14 Qualifier	RINSATE 16 Concen.	RINSATE 16 Qualifier	RINSATE 19 Concen.	RINSATE 19 Qualifier
1,2-Dichloroethene													1.0	U	1.0	U	1.0	U
Dichloromethane													5.0	U	5.0	U	5.0	U
1,2-Dichloropropane													1.0	U	1.0	U	1.0	U
1,3-Dichloropropene													1.0	U	1.0	U	1.0	U
1,1,2,2-Tetrachloroethane													1.0	U	1.0	U	1.0	U
1,1,1,2-Tetrachloroethane													5.0	NR	5.0	NR	5.0	U
Tetrachloroethene													1.0	U	1.0	U	1.0	U
1,1,1-Trichloroethane													1.0	U	1.0	U	1.0	U
1,1,2-Trichloroethane													1.0	U	1.0	U	1.0	U
Trichloroethene													1.0	U	1.0	U	1.0	U
Trichlorofluoromethane													1.0	U	1.0	U	1.0	U
Trichloropropane													1.0	NR	1.0	NR	1.0	U
Vinyl chloride													2.0	U	2.0	U	2.0	U
8020 Aromatic Volatile Organics (μg/L)																		
Benzene													1.0	U	1.0	U	1.0	U
Ethylbenzene													2.0	U	2.0	U	2.0	U
Toluene													2.0	U	2.0	U	2.0	U
Xylenes (total)													4.0	U	4.0	U	4.0	U
Chlorobenzene													2.0	U	2.0	U	2.0	U
1,2-dichlorobenzene													4.0	U	4.0	U	4.0	U
1,3-dichlorobenzene													4.0	U	4.0	U	4.0	U
1,4-dichlorobenzene													4.0	U	4.0	U	4.0	U

Analytical Data Summary
QA/QC Samples
Great Falls SI

Analysis	FIELD BLANK-HPLC Concen. (Fall)	Qualifier (Fall)	FIELD BLANK-DI Concen. (Fall)	Qualifier (Fall)	FIELD BLANK Concen. (Fall)	Qualifier (Fall)	FIELD BLANK-HPLC Concen. (Spring)	Qualifier (Spring)	FIELD BLANK-DI Concen. (Spring)	Qualifier (Spring)
GC/MS Volatile Organics (µg/L)										
Chloromethane	10	U	10	U	10	U				
Bromomethane	10	U	10	U	10	U				
Vinyl Chloride	10	U	10	U	10	U				
Chloroethane	10	U	10	U	10	U				
Methylene Chloride	9	UB	14	UB	10	UB				
Acrolein	10	U	10	U	10	U				
Acetone	100	U	100	U	100	U				
Acrylonitrile	10	U	10	U	10	U				
Carbon disulfide	10	U	10	U	10	U				
Trichlorofluoromethane	10	U	10	U	10	U				
1,1-Dichloroethene	5	U	5	U	5	U				
1,1-Dichloroethane	5	U	5	U	5	U				
trans-1,2-Dichloroethene	5	U	5	U	5	U				
Chloroform	20		5	U	13					
1,2-Dichloroethane	5	U	5	U	5	U				
2-Butanone	100	U	100	U	100	U				
1,1,1-Trichloroethane	5	U	5	U	5	U				
Carbon tetrachloride	5	U	5	U	5	U				
Vinyl acetate	50	U	50	U	50	U				
Bromodichloromethane	5		5	U	8					
1,2-Dichloropropane	5	U	5	U	5	U				
cis-1,3-Dichloropropene	5	U	5	U	5	U				
Trichloroethene	5	U	5	U	5	U				
Benzene	5	U	5	U	5	U				
Dibromochloromethane	5	U	5	U	5	U				
1,1,2-Trichloroethane	5	U	5	U	5	U				
trans-1,3-Dichloropropene	5	U	5	U	5	U				
2-Chloroethylvinylether	10	U	10	U	10	U				
Bromoform	5	U	5	U	5	U				
2-Hexanone	50	U	50	U	50	U				
4-Methyl-2-pentanone	50	U	50	U	50	U				
Tetrachloroethene	5	U	5	U	5	U				
1,1,2,2-Tetrachloroethane	5	U	5	U	5	U				
Toluene	5	U	5	U	5	U				
Chlorobenzene	5	U	5	U	5	U				
Ethylbenzene	5	U	5	U	5	U				

Analytical Data Summary
QA/QC Samples
Great Falls SI

Analysis	FIELD BLANK-HPLC Concen. (Fall)	Qualifier	FIELD BLANK-DI Concen. (Fall)	Qualifier	FIELD BLANK Concen. (Fall)	Qualifier	FIELD BLANK-HPLC Concen. (Spring)	Qualifier	FIELD BLANK-DI Concen. (Spring)	Qualifier
Styrene	5	U	5	U	5	U				
m/p-xylene	5	U	5	U	5	U				
o-xylene	5	U	5	U	5	U				
1,3-dichlorobenzene	5	U	5	U	5	U				
1,2/1,4-dichlorobenzene	5	U	5	U	5	U				
GC/MS Semivolatile Organics (µg/L)										
N-Nitroso-dimethylamine	20	U	20	U	20	U	20	U	20	U
Phenol	20	U	20	U	20	U	20	U	20	U
Bis(2-chloroethyl)ether	20	U	20	U	20	U	20	U	20	U
2-Chlorophenol	20	U	20	U	20	U	20	U	20	U
1,3-Dichlorobenzene	20	U	20	U	20	U	20	U	20	U
1,4-Dichlorobenzene	20	U	20	U	20	U	20	U	20	U
Benzylalcohol	20	U	20	U	20	U	20	U	20	U
1,2-Dichlorobenzene	20	U	20	U	20	U	20	U	20	U
2-Methylphenol	20	U	20	U	20	U	20	U	20	U
Bis(2-chloroisopropyl)ether	20	U	20	U	20	U	20	U	20	U
4-Methylphenol	20	U	20	U	20	U	20	U	20	U
N-Nitroso-di-n-propylamine	20	U	20	U	20	U	20	U	20	U
Hexachloroethane	20	U	20	U	20	U	20	U	20	U
Nitrobenzene	20	U	20	U	20	U	20	U	20	U
Isophorone	20	U	20	U	20	U	20	U	20	U
2-Nitrophenol	20	U	20	U	20	U	20	U	20	U
2,4-Dimethylphenol	20	U	20	U	20	U	20	U	20	U
Bis(2-chloroethoxy)methane	20	U	20	U	20	U	20	U	20	U
2,4-Dichlorophenol	20	U	20	U	20	U	20	U	20	U
Benzoic acid	100	U	100	U	100	U	100	U	100	U
1,2,4-Trichlorobenzene	20	U	20	U	20	U	20	U	20	U
Naphthalene	20	U	20	U	20	U	20	U	20	U
4-Chloroaniline	20	U	20	U	20	U	20	U	20	U
Hexachlorobutadiene	20	U	20	U	20	U	20	U	20	U
4-Chloro-3-methylphenol	20	U	20	U	20	U	20	U	20	U
2-Methylnaphthalene	20	U	20	U	20	U	20	U	20	U
Hexachlorocyclopentadiene	20	U	20	U	20	U	20	U	20	U
2,4,6-Trichlorophenol	20	U	20	U	20	U	20	U	20	U
2,4,5-Trichlorophenol	100	U	100	U	100	U	100	U	100	U
2-Chloronaphthalene	20	U	20	U	20	U	20	U	20	U

Analytical Data Summary
QA/QC Samples
Great Falls SI

Analysis	FIELD BLANK-HPLC Concen. (Fall)	Qualifier	FIELD BLANK-DI Concen. (Fall)	Qualifier	FIELD BLANK Concen. (Fall)	Qualifier	FIELD BLANK-HPLC Concen. (Spring)	Qualifier	FIELD BLANK-DI Concen. (Spring)	Qualifier
2-Nitroaniline	100	U	100	U	100	U	100	U	100	U
Dimethylphthalate	20	U	20	U	20	U	20	U	20	U
Acenaphthylene	20	U	20	U	20	U	20	U	20	U
2,6-Dinitrotoluene	20	U	20	U	20	U	20	U	20	U
3-Nitroaniline	100	U	100	U	100	U	100	U	100	U
Acenaphthene	20	U	20	U	20	U	20	U	20	U
2,4-Dinitrophenol	100	U	100	U	100	U	100	U	100	U
Dibenzofuran	20	U	20	U	20	U	20	U	20	U
4-Nitrophenol	100	U	100	U	100	U	100	U	100	U
2,4-Dinitrotoluene	20	U	20	U	20	U	20	U	20	U
Fluorene	20	U	20	U	20	U	20	U	20	U
Diethylphthalate	20	U	20	U	20	U	20	U	20	U
4-Chlorophenylphenylether	20	U	20	U	20	U	20	U	20	U
4-Nitroaniline	100	U	100	U	100	U	100	U	100	U
4,6-Dinitro-2-methylphenol	100	U	100	U	100	U	100	U	100	U
N-Nitrosodiphenylamine	20	U	20	U	20	U	20	U	20	U
4-Bromophenylphenylether	20	U	20	U	20	U	20	U	20	U
Hexachlorobenzene	20	U	20	U	20	U	20	U	20	U
Pentachlorophenol	100	U	100	U	100	U	100	U	100	U
Phenanthrene	20	U	20	U	20	U	20	U	20	U
Anthracene	20	U	20	U	20	U	20	U	20	U
Di-n-butylphthalate	20	U	20	U	20	U	20	U	20	U
Fluoroanthene	20	U	20	U	20	U	20	U	20	U
Pyrene	20	U	20	U	20	U	20	U	20	U
Butylbenzylphthalate	20	U	20	U	20	U	20	U	20	U
Benzo(a)anthracene	20	U	20	U	20	U	20	U	20	U
3,3'-Dichlorobenzidine	40	U	40	U	40	U	40	U	40	U
Chrysene	20	U	20	U	20	U	20	U	20	U
Bis(2-ethylhexyl)phthalate	20	U	20	U	20	U	20	U	20	U
Di-n-octylphthalate	20	U	20	U	20	U	20	U	20	U
Benzo(b)fluoranthene	20	U	20	U	20	U	20	U	20	U
Benzo(k)fluoranthene	20	U	20	U	20	U	20	U	20	U
Benzo(a)pyrene	20	U	20	U	20	U	20	U	20	U
Indeno(1,2,3-cd)pyrene	20	U	20	U	20	U	20	U	20	U
Dibenzo(a,h)anthracene	20	U	20	U	20	U	20	U	20	U
Benzo(g,h,i)perylene	20	U	20	U	20	U	20	U	20	U

Analytical Data Summary
QA/QC Samples
Great Falls SI

Analysis	FIELD BLANK-HPLC Concen. (Fall)	Qualifier (Fall)	FIELD BLANK-DI Concen. (Fall)	Qualifier (Fall)	FIELD BLANK Concen. (Fall)	Qualifier (Fall)	FIELD BLANK-HPLC Concen. (Spring)	Qualifier (Spring)	FIELD BLANK-DI Concen. (Spring)	Qualifier (Spring)
Metals (µg/L)										
Arsenic					8.8	B	2.2	UW	2.2	UW
Barium					50.0	B	1.0	U	1.0	U
Cadmium					2.0	U	2.0	U	2.0	U
Chromium					9.1	U	4.0	U	4.0	U
Copper					25.0	J	3.0	U	3.0	U
Lead					8.3	W	1.7	BN	1.5	BN
Mercury					0.1	U	2.0	U	2.0	U
Nickel					34.2	U	6.0	U	6.0	U
Selenium					1.5	UW	2.2	U	2.2	U
Silver					8.2	U	5.0	U	5.0	U
Zinc					75.0		6.5	B	14.5	B
Total Petroleum Hydrocarbons (mg/L)	ND		ND		ND		ND		ND	
8010 Halogenated Volatile Organics (µg/L)										
Benzyl chloride	5.0	NR	5.0	NR	5.0	NR	5.0	U	5.0	U
Bromobenzene	5.0	NR	5.0	NR	5.0	NR	5.0	U	5.0	U
Bromodichloromethane	4.2		1.0	U	4.1		1.0	U	1.0	U
Bromoform	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Bromomethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Carbon tetrachloride	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Chlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Chloroethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Chloroform	23.0		1.0	U	5.0		7.1		1.0	U
1-Chlorohexane	5.0	NR	5.0	NR	5.0	NR	5.0	U	5.0	U
2-Chloroethylvinylether	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Chloromethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Chlorotoluene	5.0	NR	5.0	NR	5.0	NR	5.0	U	5.0	U
Dibromochloromethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Dibromomethane	5.0	NR	5.0	NR	5.0	NR	5.0	U	5.0	U
1,2-dichlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,3-dichlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,4-dichlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Dichlorodifluoromethane	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U
1,1-Dichloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2-Dichloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1-Dichloroethene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U

Analytical Data Summary
QA/QC Samples
Great Falls SI

Analysis	FIELD BLANK-HPLC Concen. (Fall)	Qualifier (Fall)	FIELD BLANK-DI Concen. (Fall)	Qualifier (Fall)	FIELD BLANK Concen. (Fall)	Qualifier (Fall)	FIELD BLANK-HPLC Concen. (Spring)	Qualifier (Spring)	FIELD BLANK-DI Concen. (Spring)	Qualifier (Spring)
1,2-Dichloroethene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Dichloromethane	5.0	U	5.0	U	5.0	U	5.0		5.0	U
1,2-Dichloropropane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,3-Dichloropropene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1,2,2-Tetrachloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1,1,2-Tetrachloroethane	5.0	NR	5.0	NR	5.0	NR	5.0	U	5.0	U
Tetrachloroethene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1,1-Trichloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1,2-Trichloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Trichloroethene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Trichlorofluoromethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Trichloropropane	1.0	NR	1.0	NR	1.0	NR	1.0	U	1.0	U
Vinyl chloride	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
8020 Aromatic Volatile Organics (μg/L)										
Benzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Ethylbenzene	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Toluene	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Xylenes (total)	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
Chlorobenzene	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
1,2-dichlorobenzene	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
1,3-dichlorobenzene	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
1,4-dichlorobenzene	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U

Analytical Data Summary
Soil Sample Trip Blanks
Great Falls SI

Analysis	09/19/90 Concen.	09/19/90 Qualifier	09/20/90 Concen.	09/20/90 Qualifier	09/20/90 Concen.	09/20/90 Qualifier	09/21/90 Concen.	09/21/90 Qualifier	09/24/90 Concen.	09/24/90 Qualifier	09/25/90 Concen.	09/25/90 Qualifier	09/26/90 (Rinsate 7) Concen.	09/26/90 (Rinsate 7) Qualifier	09/27/90 Concen.	09/27/90 Qualifier	09/29/90 Concen.	09/29/90 Qualifier
GC/MS Volatile Organics (µg/L)																		
Chloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromomethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Vinyl chloride	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Methylene Chloride	13	UB	13	UB	10	UB	10	UB	15	UB	15	UB	11	UB	18	UB	13	UB
Acrolein	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Acetone	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U
Acrylonitrile	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Carbon disulfide	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Trichlorofluoromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1-Dichloroethene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,1-Dichloroethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
trans-1,2-Dichloroethene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Chloroform	5	U	5	U	5	U	5	U	5	U	5	U	9		5	U	5	U
1,2-Dichloroethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2-Butanone	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U
1,1,1-Trichloroethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Carbon tetrachloride	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Vinyl acetate	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U
Bromodichloromethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,2-Dichloropropane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
cis-1,3-Dichloropropene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Trichloroethene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Benzene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Dibromochloromethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,1,2-Trichloroethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
trans-1,3-Dichloropropene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2-Chloroethylvinylether	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromoform	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2-Hexanone	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U
4-Methyl-2-pentanone	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U
Tetrachloroethene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,1,2,2-Tetrachloroethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Toluene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Chlorobenzene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Ethylbenzene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U

Analytical Data Summary
Soil Sample Trip Blanks
Great Falls SI

Analysis	09/19/90		09/20/90		09/20/90		09/21/90		09/24/90		09/25/90		09/26/90 (Rinsate 7)		09/27/90		09/29/90	
	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier
Styrene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
m/p-xylene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
o-xylene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,3-dichlorobenzene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,2/1,4-dichlorobenzene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U

Analytical Data Summary
Soil Sample Trip Blanks
Great Falls SI

Analysis	10/01/90 Concen.	Qualifier	10/09/90 Concen.	Qualifier	10/10/90 Concen.	Qualifier	10/11/90 Concen.	Qualifier
GC/MS Volatile Organics (µg/L)								
Chloromethane	10	U	10	U	10	U	10	U
Bromomethane	10	U	10	U	10	U	10	U
Vinyl chloride	10	U	10	U	10	U	10	U
Chloroethane	10	U	10	U	10	U	10	U
Methylene Chloride	13	UB	17	UB	22	UB	18	UB
Acrolein	10	U	10	U	10	U	10	U
Acetone	100	U	100	U	100	U	100	U
Acrylonitrile	10	U	10	U	10	U	10	U
Carbon disulfide	10	U	10	U	10	U	10	U
Trichlorofluoromethane	10	U	10	U	10	U	10	U
1,1-Dichloroethene	5	U	5	U	5	U	5	U
1,1-Dichloroethane	5	U	5	U	5	U	5	U
trans-1,2-Dichloroethene	5	U	5	U	5	U	5	U
Chloroform	5	U	5	U	5	U	5	U
1,2-Dichloroethane	5	U	5	U	5	U	5	U
2-Butanone	100	U	100	U	100	U	100	U
1,1,1-Trichloroethane	5	U	5	U	5	U	5	U
Carbon tetrachloride	5	U	5	U	5	U	5	U
Vinyl acetate	50	U	50	U	50	U	50	U
Bromodichloromethane	5	U	5	U	5	U	5	U
1,2-Dichloropropane	5	U	5	U	5	U	5	U
cis-1,3-Dichloropropene	5	U	5	U	5	U	5	U
Trichloroethene	5	U	5	U	5	U	5	U
Benzene	5	U	5	U	5	U	5	U
Dibromochloromethane	5	U	5	U	5	U	5	U
1,1,2-Trichloroethane	5	U	5	U	5	U	5	U
trans-1,3-Dichloropropene	5	U	5	U	5	U	5	U
2-Chloroethylvinylether	10	U	10	U	10	U	10	U
Bromoform	5	U	5	U	5	U	5	U
2-Hexanone	50	U	50	U	50	U	50	U
4-Methyl-2-pentanone	50	U	50	U	50	U	50	U
Tetrachloroethene	5	U	5	U	5	U	5	U
1,1,2,2-Tetrachloroethane	5	U	5	U	5	U	5	U
Toluene	5	U	5	U	5	U	5	U
Chlorobenzene	5	U	5	U	5	U	5	U
Ethylbenzene	5	U	5	U	5	U	5	U

Analytical Data Summary
Soil Sample Trip Blanks
Great Falls SI

Analysis	10/01/90		10/09/90		10/10/90		10/11/90	
	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier	Concen.	Qualifier
Styrene	5	U	5	U	5	U	5	U
m/p-xylene	5	U	5	U	5	U	5	U
o-xylene	5	U	5	U	5	U	5	U
1,3-dichlorobenzene	5	U	5	U	5	U	5	U
1,2/1,4-dichlorobenzene	5	U	5	U	5	U	5	U

Analytical Data Summary
Water Sample Trip Blanks
Great Falls SI

Analysis	10/19/90 Concen.	Qualifier	10/23/90 Concen.	Qualifier	10/25/90 Concen.	Qualifier	10/26/90 Concen.	Qualifier	02/21/91 Concen.	Qualifier	02/22/91 Concen.	Qualifier	02/22/91 Concen.	
8010 Halogenated Volatile Organics (μg/L)														
Benzyl chloride	5.0	NR	5.0	NR	5.0	NR	5.0	NR	5.0	U	5.0	U	5.0	U
Bromobenzene	5.0	NR	5.0	NR	5.0	NR	5.0	NR	5.0	U	5.0	U	5.0	U
Bromodichloromethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Bromoform	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Bromomethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Carbon tetrachloride	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Chlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Chloroethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Chloroform	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1-Chlorohexane	5.0	NR	5.0	NR	5.0	NR	5.0	NR	5.0	U	5.0	U	5.0	U
2-Chloroethylvinylether	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Chloromethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Chlorotoluene	5.0	NR	5.0	NR	5.0	NR	5.0	NR	5.0	U	5.0	U	5.0	U
Dibromochloromethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Dibromomethane	5.0	NR	5.0	NR	5.0	NR	5.0	NR	5.0	U	5.0	U	5.0	U
1,2-dichlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,3-dichlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,4-dichlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Dichlorodifluoromethane	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U
1,1-Dichloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2-Dichloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1-Dichloroethene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2-Dichloroethene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Dichloromethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,2-Dichloropropane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,3-Dichloropropene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1,2,2-Tetrachloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1,1,2-Tetrachloroethane	5.0	NR	5.0	NR	5.0	NR	5.0	NR	5.0	U	5.0	U	5.0	U
Tetrachloroethene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1,1-Trichloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1,2-Trichloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Trichloroethene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Trichlorofluoromethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Trichloropropane	1.0	NR	1.0	NR	1.0	NR	1.0	NR	1.0	U	1.0	U	1.0	U
Vinyl chloride	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U

Analytical Data Summary
Water Sample Trip Blanks
Great Falls SI

Analysis	10/19/9. Concen.	Qualifier	10/23/90 Concen.	Qualifier	10/25/90 Concen.	Qualifier	10/26/90 Concen.	Qualifier	02/21/91 Concen.	Qualifier	02/22/91 Concen.	Qualifier	02/22/91 Concen.	
8020 Aromatic Volatile Organics (µg/L)														
Benzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Ethylbenzene	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Toluene	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Xylenes (total)	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
Chlorobenzene	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
1,2-dichlorobenzene	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
1,3-dichlorobenzene	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
1,4-dichlorobenzene	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U

C.2 Laboratory Data

Investigation-Derived Materials

GC ANALYTICAL REPORT
Analytical Method
8010 Halogenated Compounds

Work Order NO.: 2377 % Moisture:NA

Client ID:TW1 Matrix:Water

Laboratory ID:2377-1 Level:NA

Date Collected:10/26/90 Units:ug/L

Dilution Factor: 1.0 Date Analyzed:10/30/90
Date Confirmed:NA

Compound	Result	Reporting Limit
Benzyl Chloride	NR	5.0
Bromobenzene	NR	5.0
Bromodichloromethane	U	1.0
Bromoform	U	2.0
Bromomethane	U	5.0
Carbon Tetrachloride	U	1.0
Chlorobenzene	U	1.0
Chloroethane	U	5.0
Chloroform	U	1.0
1-Chlorohexane	NR	5.0
2-Chloroethylvinylether	U	2.0
Chloromethane	U	5.0
Chlorotoluenes	NR	5.0
Dibromochloromethane	U	1.0
Dibromomethane	NR	5.0
1,2-Dichlorobenzene	U	1.0
1,3-Dichlorobenzene	U	1.0
1,4-Dichlorobenzene	U	1.0
Dichlordifluoromethane	U	10.0
1,1-Dichloroethane	U	1.0
1,2-Dichloroethane	U	1.0
1,1-Dichloroethylene	U	1.0
1,2-Dichloroethylene	U	1.0
Dichloromethane	U	5.0
1,2-Dichloropropane	U	1.0
1,3-Dichloropropylene	U	1.0
1,1,2,2-Tetrachloroethane	U	1.0
1,1,1,2-Tetrachloroethane	NR	5.0
Tetrachloroethylene	U	1.0
1,1,1-Trichloroethane	U	1.0
1,1,2-Trichloroethane	U	1.0
Trichloroethylene	U	1.0
Trichlorofluoromethane	U	1.0
Trichloropropane	NR	1.0
Vinyl chloride	U	2.0

NR-Not Reported NA-Not Applicable D-Additional Dilution Factor
U-Not Found At or Above Reporting Limits
ANALYST: CWSmith GROUP LEADER: SF

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley, CA 94710

GC ANALYTICAL REPORT
Analytical Method
8020 Aromatic Compounds

Work Order NO.: 2377	% Moisture: NA
Client ID: TW1	Matrix: Water
Laboratory ID: 2377-1	Level: NA
Date Collected: 10/26/90	Units: ug/L
Dilution Factor: 1.0	Date Analyzed: 10/30/90
	Date Confirmed: NA

Compound	Result	Reporting Limit
Benzene	U	1.0
Ethyl Benzene	U	2.0
Toluene	U	2.0
Xylenes (total)	U	4.0
Chlorobenzene	U	2.0
1,2 Dichlorobenzene	U	4.0
1,3 Dichlorobenzene	U	4.0
1,4 Dichlorobenzene	U	4.0

NA-Not Applicable
U- Not Found At or Above Reporting Limits
D-Additional Dilution Factor

ANALYST: CWSmith

GROUP LEADER: JF

ES-ENGINEERING SCIENCE, INC.
600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
8010 Halogenated Compounds

Work Order NO.: 2377 % Moisture:NA

Client ID:TW2 Matrix:Water

Laboratory ID:2377-2 Level:NA

Date Collected:10/26/90 Units:ug/L

Dilution Factor: 1.0 Date Analyzed:10/30/90
Date Confirmed:NA

Compound	Result	Reporting Limit
Benzyl Chloride	NR	5.0
Bromobenzene	NR	5.0
Bromodichloromethane	U	1.0
Bromoform	U	2.0
Bromomethane	U	5.0
Carbon Tetrachloride	U	1.0
Chlorobenzene	U	1.0
Chloroethane	U	5.0
Chloroform	U	1.0
1-Chlorohexane	NR	5.0
2-Chloroethylvinylether	U	2.0
Chloromethane	U	5.0
Chlorotoluenes	NR	5.0
Dibromochloromethane	U	1.0
Dibromomethane	NR	5.0
1,2-Dichlorobenzene	U	1.0
1,3-Dichlorobenzene	U	1.0
1,4-Dichlorobenzene	U	1.0
Dichlordifluoromethane	U	10.0
1,1-Dichloroethane	U	1.0
1,2-Dichloroethane	U	1.0
1,1-Dichloroethylene	U	1.0
1,2-Dichloroethylene	U	1.0
Dichloromethane	U	5.0
1,2-Dichloropropane	U	1.0
1,3-Dichloropropylene	U	1.0
1,1,2,2-Tetrachloroethane	U	1.0
1,1,1,2-Tetrachloroethane	NR	5.0
Tetrachloroethylene	U	1.0
1,1,1-Trichloroethane	U	1.0
1,1,2-Trichloroethane	U	1.0
Trichloroethylene	U	1.0
Trichlorofluoromethane	U	1.0
Trichloropropane	NR	1.0
Vinyl chloride	U	2.0

NR-Not Reported NA-Not Applicable D-Additional Dilution Factor
U-Not Found At or Above Reporting Limits

ANALYST: C Smith GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
8020 Aromatic Compounds

Work Order NO.: 2377

% Moisture:NA

Client ID:TW2

Matrix:Water

Laboratory ID:2377-2

Level:NA

Date Collected:10/26/90

Units:ug/L

Dilution Factor: 1.0

Date Analyzed:10/30/90
Date Confirmed:NA

Compound	Result	Reporting Limit
Benzene	U	1.0
Ethyl Benzene	U	2.0
Toluene	U	2.0
Xylenes (total)	U	4.0
Chlorobenzene	U	2.0
1,2 Dichlorobenzene	U	4.0
1,3 Dichlorobenzene	U	4.0
1,4 Dichlorobenzene	U	4.0

NA-Not Applicable
U- Not Found At or Above Reporting Limits
D-Additional Dilution Factor

ANALYST: CWBrell

GROUP LEADER: SF

:S-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley, CA. 94710

GC/MS ANALYTICAL REPORT
SEMIVOLATILE ORGANICS

lork Order No: 2377 | Date Extracted: 10/30/90

.aboratory ID: 2377-01A | Date Analyzed: 10/31/90

Client ID: TW-1 | % Moisture: NA

Matrix: WATER | Level:LOW | Dilution Fact: 2.0

Compound	Analytical Results ug/L
N-Nitroso-Dimethylamine	20 U
Phenol	20 U
bis(2-Chloroethyl)ether	20 U
2-Chlorophenol	20 U
1,3-Dichlorobenzene	20 U
1,4-Dichlorobenzene	20 U
Benzyl Alcohol	20 U
1,2-Dichlorobenzene	20 U
2-Methylphenol	20 U
bis(2-chloroisopropyl)Ether	20 U
4-Methylphenol	20 U
N-Nitroso-Di-n-Propylamine	20 U
Hexachloroethane	20 U
Nitrobenzene	20 U
Isophorone	20 U
2-Nitrophenol	20 U
2,4-Dimethylphenol	20 U
bis(2-Chloroethoxy)methane	20 U
2,4-Dichlorophenol	20 U
Benzoic Acid	100 U
1,2,4-Trichlorobenzene	20 U
Naphthalene	20 U
4-Chloroaniline	20 U
Hexachlorobutadiene	20 U
4-Chloro-3-Methylphenol	20 U
2-Methylnaphthalene	20 U
Hexachlorocyclopentadiene	20 U
2,4,6-Trichlorophenol	20 U
2,4,5-Trichlorophenol	100 U
2-Chloronaphthalene	20 U
2-Nitroaniline	100 U
Dimethylphthalate	20 U
Acenaphthylene	20 U
2,6-Dinitrotoluene	20 U
3-Nitroaniline	20 J
Acenaphthene	20 U
2,4-Dinitrophenol	100 U
Dibenzofuran	20 U
4-Nitrophenol	100 U

ES-ENGINEERING SCIENCE, INC.

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GC/MS ANALYTICAL REPORT
SEMIVOLATILE ORGANICS

Work Order No: 2377 Date Extracted: 10/30/90

Laboratory ID: 2377-01A Date Analyzed: 10/31/90

Client ID: TW-1 % Moisture: NA

Matrix: WATER Level:LOW Dilution Fact: 2.0

Compound	Analytical Results ug/L
2,4-Dinitrotoluene	20 U
Fluorene	20 U
Diethylphthalate	20 U
4-Chlorophenyl-phenylether	20 U
4-Nitroaniline	100 U
4,6-Dinitro-2-Methylphenol	100 U
N-Nitrosodiphenylamine	20 U
4-Bromophenyl-phenylether	20 U
Hexachlorobenzene	20 U
Pentachlorophenol	100 U
Phenanthrene	20 U
Anthracene	20 U
Di-n-Butylphthalate	12 J
Fluoranthene	20 U
Pyrene	20 U
Butylbenzylphthalate	20 U
Benzo(a)Anthracene	20 U
3,3'-Dichlorobenzidine	40 U
Chrysene	20 U
bis(2-Ethylhexyl)Phthalate	280
Di-n-octylphthalate	20 U
Benzo(b)Fluoranthene	20 U
Benzo(k)Fluoranthene	20 U
Benzo(a)Pyrene	20 U
Indeno(1,2,3-cd)Pyrene	20 U
Dibenz(a,h)Anthracene	20 U
Benzo(g,h,i)Perylene	20 U

Analyst: Ellen Mills Group Leader: Richard Wood

ES-ENGINEERING SCIENCE, INC.

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GC/MS ANALYTICAL REPORT
SEMIVOLATILE ORGANICS

Work Order No: 2377

Date Extracted: 10/30/90

Laboratory ID: 2377-02A

Date Analyzed: 10/31/90

Client ID: TW-2

% Moisture: NA

Matrix: WATER

Level: LOW

Dilution Fact: 2.0

Compound	Analytical Results ug/L
N-Nitroso-Dimethylamine	20 U
Phenol	20 U
bis(2-Chloroethyl)ether	20 U
2-Chlorophenol	20 U
1,3-Dichlorobenzene	20 U
1,4-Dichlorobenzene	20 U
Benzyl Alcohol	20 U
1,2-Dichlorobenzene	20 U
2-Methylphenol	20 U
bis(2-chloroisopropyl)Ether	20 U
4-Methylphenol	20 U
N-Nitroso-Di-n-Propylamine	20 U
Hexachloroethane	20 U
Nitrobenzene	20 U
Isophorone	20 U
2-Nitrophenol	20 U
2,4-Dimethylphenol	20 U
bis(2-Chloroethoxy)methane	20 U
2,4-Dichlorophenol	20 U
Benzoic Acid	100 U
1,2,4-Trichlorobenzene	20 U
Naphthalene	20 U
4-Chloroaniline	20 U
Hexachlorobutadiene	20 U
4-Chloro-3-Methylphenol	20 U
2-Methylnaphthalene	20 U
Hexachlorocyclopentadiene	20 U
2,4,6-Trichlorophenol	20 U
2,4,5-Trichlorophenol	100 U
2-Chloronaphthalene	20 U
2-Nitroaniline	100 U
Dimethylphthalate	20 U
Acenaphthylene	20 U
2,6-Dinitrotoluene	20 U
3-Nitroaniline	100 U
Acenaphthene	20 U
2,4-Dinitrophenol	100 U
Dibenzofuran	20 U
4-Nitrophenol	100 U

ES-ENGINEERING SCIENCE, INC.

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GC/MS ANALYTICAL REPORT
SEMIVOLATILE ORGANICS

Work Order No: 2377 Date Extracted: 10/30/90

Laboratory ID: 2377-02A Date Analyzed: 10/31/90

Client ID: TW-2 % Moisture: NA

Matrix: WATER Level:LOW Dilution Fact: 2.0

Compound	Analytical Results ug/L
2,4-Dinitrotoluene	20 U
Fluorene	20 U
Diethylphthalate	20 U
4-Chlorophenyl-phenylether	20 U
4-Nitroaniline	100 U
4,6-Dinitro-2-Methylphenol	100 U
N-Nitrosodiphenylamine	20 U
4-Bromophenyl-phenylether	20 U
Hexachlorobenzene	20 U
Pentachlorophenol	100 U
Phenanthrene	20 U
Anthracene	20 U
Di-n-Butylphthalate	25
Fluoranthene	20 U
Pyrene	20 U
Butylbenzylphthalate	20 U
Benzo(a)Anthracene	20 U
3,3'-Dichlorobenzidine	40 U
Chrysene	20 U
bis(2-Ethylhexyl)Phthalate	980 D
Di-n-octylphthalate	43
Benzo(b)Fluoranthene	20 U
Benzo(k)Fluoranthene	20 U
Benzo(a)Pyrene	20 U
Indeno(1,2,3-cd)Pyrene	20 U
Dibenz(a,h)Anthracene	20 U
Benzo(g,h,i)Perylene	20 U

Analyst: Ellen Mills

Group Leader: Richard Wood

ES-ENGINEERING-SCIENCE, INC.

600 Bancroft Way
Berkeley, CA 94710

INORGANICS ANALYTICAL REPORT

Client: ES-Austin
Project: Great Falls SI

Work Order: 2377
Matrix: Water

Client's ID:	TW-1 Tank 1115	TW-2 Tank 1130
Date Sampled:	10/26/90	10/26/90
Date Received:	10/27/90	10/27/90
% Solids:	NA	NA
Lab ID:	2377.01 H	2377.02 H

Parameter	Results				Method	Units	Date Analyzed
Arsenic	6.9	B	9.7	B	GF-AA	ug/L	10/31/90
Barium	38.0	B	242.		ICP	(PPB)	11/01/90
Cadmium	2.0	B	12.0		ICP	in	11/01/90
Chromium	9.1	U	20.0		ICP	Water	11/01/90
Copper	17.0	B	78.0		ICP	"	11/01/90
Lead	14.2	S	73.0		GF-AA	"	11/01/90
Mercury	.10	U	.10	U	CV-AA	"	11/01/90
Nickel	34.2	U	34.2	U	ICP	"	11/01/90
Selenium	1.5	U	1.5	U	GF-AA	"	11/01/90
Silver	8.2	U	8.2	U	ICP	"	11/01/90
Zinc	53.0		257.		ICP	"	11/01/90

NA- Not Applicable
ND- Not Detected

ANALYST: J. Michael

GROUP LEADER: [signature]

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley,CA 94710

ORGANIC ANALYTICAL REPORT

Work Order NO.: 2377

Parameter: TPH

Matrix: Water

Analytical Method: 418.1

Unit: mg/L

QC Batch NO.: W90QCB017TPH

Date Extracted: 10/30/90

Sample ID:	Client ID:	Result	Reporting Limit	Date Analyzed
2377-01	TANK TW-1	150	1	10/30/90
2377-02	TANK TW-2	77	1	10/30/90
MWTPH900927 (BLANK)	NA	ND	1	10/30/90

NA_ Not Analyzed
ND_ Not Detected

ANALYST: Dani B

GROUP LEADER: SF

:S-ENGINEERING SCIENCE, INC.

600 Bancroft Way
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GC/MS ANALYTICAL REPORT
VOLATILE ORGANICS

Iork Order No: 2376

.aboratory ID: 2376-02 Date Analyzed: 11/05/90

Client ID: GROUPI-A % Moisture: NA

Matrix: TCLP Level: LOW Dilution Fact: 1.0

Compound	Analytical Results ug/L		
Chloromethane	10	U	
Bromomethane	10	U	
Vinyl Chloride	10	U	
Chloroethane	10	U	
Methylene Chloride	12		B
Acrolein	10	U	
Acetone	18	J	
Acrylonitrile	10	U	
Carbon Disulfide	10	U	
Trichlorofluoromethane	10	U	
1,1-Dichloroethene	5	U	
1,1-Dichloroethane	5	U	
trans-1,2-Dichloroethene	5	U	
Chloroform	5	U	
1,2-Dichloroethane	5	U	
2-Butanone	100	U	
1,1,1-Trichloroethane	5	U	
Carbon Tetrachloride	5	U	
Vinyl Acetate	50	U	
Bromodichloromethane	5	U	
1,2-Dichloropropane	5	U	
cis-1,3-Dichloropropene	5	U	
Trichloroethene	5	U	
Benzene	5	U	
Dibromochloromethane	5	U	
1,1,2-Trichloroethane	5	U	
trans-1,3-Dichloropropene	5	U	
2-Chloroethylvinylether	10	U	
Bromoform	5	U	
2-Hexanone	50	U	
4-Methyl-2-pentanone	50	U	
Tetrachloroethene	5	U	
1,1,2,2-Tetrachloroethane	5	U	
Toluene	5	U	
Chlorobenzene	5	U	
Ethylbenzene	5	U	
Styrene	5	U	
m/p-Xylene	5	U	
o-Xylene	5	U	
1,3-Dichlorobenzene	5	U	
1,2/1,4-Dichlorobenzene	5	U	

Analyst: Nicker Heath Group Leader: Richard Ward

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
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GC/MS ANALYTICAL REPORT
VOLATILE ORGANICS

Work Order No: 2376

Laboratory ID: 2376-05 Date Analyzed: 11/05/90

Client ID: GROUPII-A % Moisture: NA

Matrix: TCLP Level: LOW Dilution Fact: 1.0

Compound	Analytical Results ug/L		
Chloromethane	10	U	
Bromomethane	10	U	
Vinyl Chloride	10	U	
Chloroethane	10	U	
Methylene Chloride	10		B
Acrolein	10	U	
Acetone	14	J	
Acrylonitrile	10	U	
Carbon Disulfide	10	U	
Trichlorofluoromethane	10	U	
1,1-Dichloroethene	5	U	
1,1-Dichloroethane	5	U	
trans-1,2-Dichloroethene	5	U	
Chloroform	5	U	
1,2-Dichloroethane	5	U	
2-Butanone	100	U	
1,1,1-Trichloroethane	5	U	
Carbon Tetrachloride	5	U	
Vinyl Acetate	50	U	
Bromodichloromethane	5	U	
1,2-Dichloropropane	5	U	
cis-1,3-Dichloropropene	5	U	
Trichloroethene	5	U	
Benzene	5	U	
Dibromochloromethane	5	U	
1,1,2-Trichloroethane	5	U	
trans-1,3-Dichloropropene	5	U	
2-Chloroethylvinylether	10	U	
Bromoform	5	U	
2-Hexanone	50	U	
4-Methyl-2-pentanone	50	U	
Tetrachloroethene	5	U	
1,1,2,2-Tetrachloroethane	5	U	
Toluene	5	U	
Chlorobenzene	5	U	
Ethylbenzene	5	U	
Styrene	5	U	
m/p-Xylene	5	U	
o-Xylene	5	U	
1,3-Dichlorobenzene	5	U	
1,2/1,4-Dichlorobenzene	5	U	

Analyst: Nicki Heath Group Leader: [signature]

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
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GC/MS ANALYTICAL REPORT
VOLATILE ORGANICS

Work Order No: 2376

Laboratory ID: 2376-08 Date Analyzed: 11/05/90

Client ID: GROUPII-B % Moisture: NA

Matrix: TCLP Level: LOW Dilution Fact: 1.0

Compound	Analytical Results ug/L		
Chloromethane	10	U	
Bromomethane	10	U	
Vinyl Chloride	10	U	
Chloroethane	10	U	
Methylene Chloride	9		B
Acrolein	10	U	
Acetone	9	J	
Acrylonitrile	10	U	
Carbon Disulfide	10	U	
Trichlorofluoromethane	10	U	
1,1-Dichloroethene	5	U	
1,1-Dichloroethane	5	U	
trans-1,2-Dichloroethene	5	U	
Chloroform	5	U	
1,2-Dichloroethane	5	U	
2-Butanone	100	U	
1,1,1-Trichloroethane	5	U	
Carbon Tetrachloride	5	U	
Vinyl Acetate	50	U	
Bromodichloromethane	5	U	
1,2-Dichloropropane	5	U	
cis-1,3-Dichloropropene	5	U	
Trichloroethene	5	U	
Benzene	5	U	
Dibromochloromethane	5	U	
1,1,2-Trichloroethane	5	U	
trans-1,3-Dichloropropene	5	U	
2-Chloroethylvinylether	10	U	
Bromoform	5	U	
2-Hexanone	50	U	
4-Methyl-2-pentanone	50	U	
Tetrachloroethene	5	U	
1,1,2,2-Tetrachloroethane	5	U	
Toluene	5	U	
Chlorobenzene	5	U	
Ethylbenzene	5	U	
Styrene	5	U	
m/p-Xylene	5	U	
o-Xylene	5	U	
1,3-Dichlorobenzene	5	U	
1,2/1,4-Dichlorobenzene	5	U	

Analyst: Nicki Heath Group Leader: Richard Wood

ES-ENGINEERING SCIENCE, INC.

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GC/MS ANALYTICAL REPORT
VOLATILE ORGANICS

Work Order No: 2376

Laboratory ID: 2376-11

Date Analyzed: 11/05/90

Client ID: GROUPIII-A

% Moisture: NA

Matrix: TCLP

Level: LOW

Dilution Fact: 1.0

Compound	Analytical Results ug/L		
Chloromethane	10	U	
Bromomethane	10	U	
Vinyl Chloride	10	U	
Chloroethane	10	U	
Methylene Chloride	9		B
Acrolein	10	U	
Acetone	7	J	
Acrylonitrile	10	U	
Carbon Disulfide	10	U	
Trichlorofluoromethane	10	U	
1,1-Dichloroethene	5	U	
1,1-Dichloroethane	5	U	
trans-1,2-Dichloroethene	5	U	
Chloroform	5	U	
1,2-Dichloroethane	5	U	
2-Butanone	100	U	
1,1,1-Trichloroethane	5	U	
Carbon Tetrachloride	5	U	
Vinyl Acetate	50	U	
Bromodichloromethane	5	U	
1,2-Dichloropropane	5	U	
cis-1,3-Dichloropropene	5	U	
Trichloroethene	5	U	
Benzene	5	U	
Dibromochloromethane	5	U	
1,1,2-Trichloroethane	5	U	
trans-1,3-Dichloropropene	5	U	
2-Chloroethylvinylether	10	U	
Bromoform	5	U	
2-Hexanone	50	U	
4-Methyl-2-pentanone	50	U	
Tetrachloroethene	5	U	
1,1,2,2-Tetrachloroethane	5	U	
Toluene	5	U	
Chlorobenzene	5	U	
Ethylbenzene	5	U	
Styrene	5	U	
m/p-Xylene	5	U	
o-Xylene	5	U	
1,3-Dichlorobenzene	5	U	
1,2/1,4-Dichlorobenzene	5	U	

Analyst: Nicki Heath

Group Leader: [signature]

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley, CA. 94710

GC/MS ANALYTICAL REPORT
VOLATILE ORGANICS

Work Order No: 2376

Laboratory ID: 2376-14 Date Analyzed: 11/05/90

Client ID: GROUPIII-B % Moisture: NA

Matrix: TCLP Level: LOW Dilution Fact: 1.0

Compound	Analytical Results ug/L		
Chloromethane	10	U	
Bromomethane	10	U	
Vinyl Chloride	10	U	
Chloroethane	10	U	
Methylene Chloride	15		B
Acrolein	10	U	
Acetone	8	J	
Acrylonitrile	10	U	
Carbon Disulfide	10	U	
Trichlorofluoromethane	10	U	
1,1-Dichloroethene	5	U	
1,1-Dichloroethane	5	U	
trans-1,2-Dichloroethene	5	U	
Chloroform	5	U	
1,2-Dichloroethane	5	U	
2-Butanone	100	U	
1,1,1-Trichloroethane	5	U	
Carbon Tetrachloride	5	U	
Vinyl Acetate	50	U	
Bromodichloromethane	5	U	
1,2-Dichloropropane	5	U	
cis-1,3-Dichloropropene	5	U	
Trichloroethene	5	U	
Benzene	5	U	
Dibromochloromethane	5	U	
1,1,2-Trichloroethane	5	U	
trans-1,3-Dichloropropene	5	U	
2-Chloroethylvinylether	10	U	
Bromoform	5	U	
2-Hexanone	50	U	
4-Methyl-2-pentanone	50	U	
Tetrachloroethene	5	U	
1,1,2,2-Tetrachloroethane	5	U	
Toluene	5	U	
Chlorobenzene	5	U	
Ethylbenzene	5	U	
Styrene	5	U	
m/p-Xylene	5	U	
o-Xylene	5	U	
1,3-Dichlorobenzene	5	U	
1,2/1,4-Dichlorobenzene	5	U	

Analyst: Nick Heath Group Leader: [illegible signature]

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
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GC/MS ANALYTICAL REPORT
VOLATILE ORGANICS

Work Order No: 2376

Laboratory ID: 2376-17 | Date Analyzed: 11/07/90

Client ID: GROUPIII-C | % Moisture: NA

Matrix: TCLP | Level: LOW | Dilution Fact: 1.0

Compound	Analytical Results ug/L		
Chloromethane	10	U	
Bromomethane	10	U	
Vinyl Chloride	10	U	
Chloroethane	10	U	
Methylene Chloride	14		B
Acrolein	10	U	
Acetone	100	U	
Acrylonitrile	10	U	
Carbon Disulfide	10	U	
Trichlorofluoromethane	10	U	
1,1-Dichloroethene	5	U	
1,1-Dichloroethane	5	U	
trans-1,2-Dichloroethene	5	U	
Chloroform	5	U	
1,2-Dichloroethane	5	U	
2-Butanone	100	U	
1,1,1-Trichloroethane	5	U	
Carbon Tetrachloride	5	U	
Vinyl Acetate	50	U	
Bromodichloromethane	5	U	
1,2-Dichloropropane	5	U	
cis-1,3-Dichloropropene	5	U	
Trichloroethene	5	U	
Benzene	5	U	
Dibromochloromethane	5	U	
1,1,2-Trichloroethane	5	U	
trans-1,3-Dichloropropene	5	U	
2-Chloroethylvinylether	10	U	
Bromoform	5	U	
2-Hexanone	50	U	
4-Methyl-2-pentanone	50	U	
Tetrachloroethene	5	U	
1,1,2,2-Tetrachloroethane	5	U	
Toluene	5	U	
Chlorobenzene	5	U	
Ethylbenzene	5	U	
Styrene	5	U	
m/p-Xylene	5	U	
o-Xylene	5	U	
1,3-Dichlorobenzene	5	U	
1,2/1,4-Dichlorobenzene	5	U	

Analyst: Nicki Heath | Group Leader: [signature]

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley, CA. 94710

GC/MS ANALYTICAL REPORT
VOLATILE ORGANICS

Work Order No: 2376

Laboratory ID: 2376-20 — Date Analyzed: 11/07/90

Client ID: GROUPIII-D — % Moisture: NA

Matrix: TCLP — Level: LOW — Dilution Fact: 1.0

Compound	Analytical Results ug/L		
Chloromethane	10	U	
Bromomethane	10	U	
Vinyl Chloride	10	U	
Chloroethane	10	U	
Methylene Chloride	14		B
Acrolein	10	U	
Acetone	100	U	
Acrylonitrile	10	U	
Carbon Disulfide	10	U	
Trichlorofluoromethane	10	U	
1,1-Dichloroethene	5	U	
1,1-Dichloroethane	5	U	
trans-1,2-Dichloroethene	5	U	
Chloroform	5	U	
1,2-Dichloroethane	5	U	
2-Butanone	100	U	
1,1,1-Trichloroethane	5	U	
Carbon Tetrachloride	5	U	
Vinyl Acetate	50	U	
Bromodichloromethane	5	U	
1,2-Dichloropropane	5	U	
cis-1,3-Dichloropropene	5	U	
Trichloroethene	5	U	
Benzene	5	U	
Dibromochloromethane	5	U	
1,1,2-Trichloroethane	5	U	
trans-1,3-Dichloropropene	5	U	
2-Chloroethylvinylether	10	U	
Bromoform	5	U	
2-Hexanone	50	U	
4-Methyl-2-pentanone	50	U	
Tetrachloroethene	5	U	
1,1,2,2-Tetrachloroethane	5	U	
Toluene	5	U	
Chlorobenzene	5	U	
Ethylbenzene	5	U	
Styrene	5	U	
m/p-Xylene	5	U	
o-Xylene	5	U	
1,3-Dichlorobenzene	5	U	
1,2/1,4-Dichlorobenzene	5	U	

Analyst: Nick Heath — Group Leader: [signature]

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GC/MS ANALYTICAL REPORT
VOLATILE ORGANICS

rk Order No: 2376

boratory ID: 2376-20DUP

Date Analyzed: 11/07/90

Client ID: GROUPIII-DDUP

% Moisture: NA

Matrix: TCLP   Level: LOW   Dilution Fact: 1.0

Compound	Analytical Results ug/L		
Chloromethane	10	U	
Bromomethane	10	U	
Vinyl Chloride	10	U	
Chloroethane	10	U	
Methylene Chloride	13		B
Acrolein	10	U	
Acetone	100	U	
Acrylonitrile	10	U	
Carbon Disulfide	10	U	
Trichlorofluoromethane	10	U	
1,1-Dichloroethene	5	U	
1,1-Dichloroethane	5	U	
trans-1,2-Dichloroethene	5	U	
Chloroform	5	U	
1,2-Dichloroethane	5	U	
2-Butanone	100	U	
1,1,1-Trichloroethane	5	U	
Carbon Tetrachloride	5	U	
Vinyl Acetate	50	U	
Bromodichloromethane	5	U	
1,2-Dichloropropane	5	U	
cis-1,3-Dichloropropene	5	U	
Trichloroethene	5	U	
Benzene	5	U	
Dibromochloromethane	5	U	
1,1,2-Trichloroethane	5	U	
trans-1,3-Dichloropropene	5	U	
2-Chloroethylvinylether	10	U	
Bromoform	5	U	
2-Hexanone	50	U	
4-Methyl-2-pentanone	50	U	
Tetrachloroethene	5	U	
1,1,2,2-Tetrachloroethane	5	U	
Toluene	5	U	
Chlorobenzene	5	U	
Ethylbenzene	5	U	
Styrene	5	U	
m/p-Xylene	5	U	
o-Xylene	5	U	
1,3-Dichlorobenzene	5	U	
1,2/1,4-Dichlorobenzene	5	U	

Analyst: Nicki Heath   Group Leader: Richard Ward

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GC/MS ANALYTICAL REPORT
SEMIVOLATILE ORGANICS

rk Order No: 2376 | Date Extracted: 11/07/90

boratory ID: 2376-03 | Date Analyzed: 11/21/90

Client ID: GROUPI_A | % Moisture: NA

Matrix: TCLP | Level:LOW | Dilution Fact: 10.0

Compound	Analytical Results ug/L	
N-Nitroso-Dimethylamine	100	U
Phenol	100	U
bis(2-Chloroethyl)ether	100	U
2-Chlorophenol	100	U
1,3-Dichlorobenzene	100	U
1,4-Dichlorobenzene	100	U
Benzyl Alcohol	100	U
1,2-Dichlorobenzene	100	U
2-Methylphenol	100	U
bis(2-chloroisopropyl)Ether	100	U
4-Methylphenol	100	U
N-Nitroso-Di-n-Propylamine	100	U
Hexachloroethane	100	U
Nitrobenzene	100	U
Isophorone	100	U
2-Nitrophenol	100	U
2,4-Dimethylphenol	100	U
bis(2-Chloroethoxy)methane	100	U
2,4-Dichlorophenol	100	U
Benzoic Acid	500	U
1,2,4-Trichlorobenzene	100	U
Naphthalene	100	U
4-Chloroaniline	100	U
Hexachlorobutadiene	100	U
4-Chloro-3-Methylphenol	100	U
2-Methylnaphthalene	100	U
Hexachlorocyclopentadiene	100	U
2,4,6-Trichlorophenol	100	U
2,4,5-Trichlorophenol	500	U
2-Chloronaphthalene	100	U
2-Nitroaniline	500	U
Dimethylphthalate	100	U
Acenaphthylene	100	U
2,6-Dinitrotoluene	100	U
3-Nitroaniline	500	U
Acenaphthene	100	U
2,4-Dinitrophenol	500	U
Dibenzofuran	100	U
4-Nitrophenol	500	U

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GC/MS ANALYTICAL REPORT
SEMIVOLATILE ORGANICS

Work Order No: 2376 | Date Extracted: 11/07/90

Laboratory ID: 2376-03 | Date Analyzed: 11/21/90

Client ID: GROUPI_A | % Moisture: NA

Matrix: TCLP | Level: LOW | Dilution Fact: 10.0

Compound	Analytical Results ug/L
2,4-Dinitrotoluene	100 U
Fluorene	100 U
Diethylphthalate	100 U
4-Chlorophenyl-phenylether	100 U
4-Nitroaniline	500 U
4,6-Dinitro-2-Methylphenol	500 U
N-Nitrosodiphenylamine	100 U
4-Bromophenyl-phenylether	100 U
Hexachlorobenzene	100 U
Pentachlorophenol	500 U
Phenanthrene	100 U
Anthracene	100 U
Di-n-Butylphthalate	100 U
Fluoranthene	100 U
Pyrene	100 U
Butylbenzylphthalate	100 U
Benzo(a)Anthracene	100 U
3,3'-Dichlorobenzidine	200 U
Chrysene	100 U
bis(2-Ethylhexyl)Phthalate	100 U
Di-n-octylphthalate	100 U
Benzo(b)Fluoranthene	100 U
Benzo(k)Fluoranthene	100 U
Benzo(a)Pyrene	100 U
Indeno(1,2,3-cd)Pyrene	100 U
Dibenz(a,h)Anthracene	100 U
Benzo(g,h,i)Perylene	100 U

Analyst: Ellen Mills

Group Leader: Richard Ward

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GC/MS ANALYTICAL REPORT
SEMIVOLATILE ORGANICS

Work Order No: 2376

Date Extracted: 11/07/90

Laboratory ID: 2376-09

Date Analyzed: 11/21/90

Client ID: GROUPII_B

% Moisture: NA

Matrix: TCLP   Level: LOW

Dilution Fact: 10.0

Compound	Analytical Results ug/L
2,4-Dinitrotoluene	100 U
Fluorene	100 U
Diethylphthalate	100 U
4-Chlorophenyl-phenylether	100 U
4-Nitroaniline	500 U
4,6-Dinitro-2-Methylphenol	500 U
N-Nitrosodiphenylamine	100 U
4-Bromophenyl-phenylether	100 U
Hexachlorobenzene	100 U
Pentachlorophenol	500 U
Phenanthrene	100 U
Anthracene	100 U
Di-n-Butylphthalate	100 U
Fluoranthene	100 U
Pyrene	100 U
Butylbenzylphthalate	100 U
Benzo(a)Anthracene	100 U
3,3'-Dichlorobenzidine	200 U
Chrysene	100 U
bis(2-Ethylhexyl)Phthalate	100 U
Di-n-octylphthalate	100 U
Benzo(b)Fluoranthene	100 U
Benzo(k)Fluoranthene	100 U
Benzo(a)Pyrene	100 U
Indeno(1,2,3-cd)Pyrene	100 U
Dibenz(a,h)Anthracene	100 U
Benzo(g,h,i)Perylene	100 U

Analyst: Ellen Mills

Group Leader: Richard Ward

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GC/MS ANALYTICAL REPORT
SEMIVOLATILE ORGANICS

Work Order No: 2376
Date Extracted: 11/07/90
Laboratory ID: 2376-06
Date Analyzed: 11/21/90
Client ID: GROUPII_A
% Moisture: NA
Matrix: TCLP
Level: LOW
Dilution Fact: 10.0

Compound	Analytical Results ug/L
N-Nitroso-Dimethylamine	100 U
Phenol	100 U
bis(2-Chloroethyl)ether	100 U
2-Chlorophenol	100 U
1,3-Dichlorobenzene	100 U
1,4-Dichlorobenzene	100 U
Benzyl Alcohol	100 U
1,2-Dichlorobenzene	100 U
2-Methylphenol	100 U
bis(2-chloroisopropyl)Ether	100 U
4-Methylphenol	100 U
N-Nitroso-Di-n-Propylamine	100 U
Hexachloroethane	100 U
Nitrobenzene	100 U
Isophorone	100 U
2-Nitrophenol	100 U
2,4-Dimethylphenol	100 U
bis(2-Chloroethoxy)methane	100 U
2,4-Dichlorophenol	100 U
Benzoic Acid	500 U
1,2,4-Trichlorobenzene	100 U
Naphthalene	100 U
4-Chloroaniline	100 U
Hexachlorobutadiene	100 U
4-Chloro-3-Methylphenol	100 U
2-Methylnaphthalene	100 U
Hexachlorocyclopentadiene	100 U
2,4,6-Trichlorophenol	100 U
2,4,5-Trichlorophenol	500 U
2-Chloronaphthalene	100 U
2-Nitroaniline	500 U
Dimethylphthalate	100 U
Acenaphthylene	100 U
2,6-Dinitrotoluene	100 U
3-Nitroaniline	500 U
Acenaphthene	100 U
2,4-Dinitrophenol	500 U
Dibenzofuran	100 U
4-Nitrophenol	500 U

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GC/MS ANALYTICAL REPORT
SEMIVOLATILE ORGANICS

Work Order No: 2376 | Date Extracted: 11/07/90

Laboratory ID: 2376-06 | Date Analyzed: 11/21/90

Client ID: GROUPII_A | % Moisture: NA

Matrix: TCLP | Level: LOW | Dilution Fact: 10.0

Compound	Analytical Results ug/L
2,4-Dinitrotoluene	100 U
Fluorene	100 U
Diethylphthalate	100 U
4-Chlorophenyl-phenylether	100 U
4-Nitroaniline	500 U
4,6-Dinitro-2-Methylphenol	500 U
N-Nitrosodiphenylamine	100 U
4-Bromophenyl-phenylether	100 U
Hexachlorobenzene	100 U
Pentachlorophenol	500 U
Phenanthrene	100 U
Anthracene	100 U
Di-n-Butylphthalate	100 U
Fluoranthene	100 U
Pyrene	100 U
Butylbenzylphthalate	100 U
Benzo(a)Anthracene	100 U
3,3'-Dichlorobenzidine	200 U
Chrysene	100 U
bis(2-Ethylhexyl)Phthalate	100 U
Di-n-octylphthalate	100 U
Benzo(b)Fluoranthene	100 U
Benzo(k)Fluoranthene	100 U
Benzo(a)Pyrene	100 U
Indeno(1,2,3-cd)Pyrene	100 U
Dibenz(a,h)Anthracene	100 U
Benzo(g,h,i)Perylene	100 U

Analyst: Ellen Mills

Group Leader: [illegible]

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GC/MS ANALYTICAL REPORT
SEMIVOLATILE ORGANICS

ork Order No: 2376

aboratory ID: 2376-12

Client ID: GROUP_III-A

Matrix: TCLP

Level:LOW

Date Extracted: 11/07/90

Date Analyzed: 11/21/90

% Moisture: NA

Dilution Fact: 10.0

Compound	Analytical Results ug/L
N-Nitroso-Dimethylamine	100 U
Phenol	100 U
bis(2-Chloroethyl)ether	100 U
2-Chlorophenol	100 U
1,3-Dichlorobenzene	100 U
1,4-Dichlorobenzene	100 U
Benzyl Alcohol	100 U
1,2-Dichlorobenzene	100 U
2-Methylphenol	100 U
bis(2-chloroisopropyl)Ether	100 U
4-Methylphenol	100 U
N-Nitroso-Di-n-Propylamine	100 U
Hexachloroethane	100 U
Nitrobenzene	100 U
Isophorone	100 U
2-Nitrophenol	100 U
2,4-Dimethylphenol	100 U
bis(2-Chloroethoxy)methane	100 U
2,4-Dichlorophenol	100 U
Benzoic Acid	500 U
1,2,4-Trichlorobenzene	100 U
Naphthalene	100 U
4-Chloroaniline	100 U
Hexachlorobutadiene	100 U
4-Chloro-3-Methylphenol	100 U
2-Methylnaphthalene	100 U
Hexachlorocyclopentadiene	100 U
2,4,6-Trichlorophenol	100 U
2,4,5-Trichlorophenol	500 U
2-Chloronaphthalene	100 U
2-Nitroaniline	500 U
Dimethylphthalate	100 U
Acenaphthylene	100 U
2,6-Dinitrotoluene	100 U
3-Nitroaniline	500 U
Acenaphthene	100 U
2,4-Dinitrophenol	500 U
Dibenzofuran	100 U
4-Nitrophenol	500 U

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GC/MS ANALYTICAL REPORT
SEMIVOLATILE ORGANICS

Work Order No: 2376 Date Extracted: 11/07/90

Laboratory ID: 2376-12 Date Analyzed: 11/21/90

Client ID: GROUP_III-A % Moisture: NA

Matrix: TCLP Level: LOW Dilution Fact: 10.0

Compound	Analytical Results ug/L	
2,4-Dinitrotoluene	100	U
Fluorene	100	U
Diethylphthalate	100	U
4-Chlorophenyl-phenylether	100	U
4-Nitroaniline	500	U
4,6-Dinitro-2-Methylphenol	500	U
N-Nitrosodiphenylamine	100	U
4-Bromophenyl-phenylether	100	U
Hexachlorobenzene	100	U
Pentachlorophenol	500	U
Phenanthrene	100	U
Anthracene	100	U
Di-n-Butylphthalate	100	U
Fluoranthene	100	U
Pyrene	100	U
Butylbenzylphthalate	100	U
Benzo(a)Anthracene	100	U
3,3'-Dichlorobenzidine	200	U
Chrysene	100	U
bis(2-Ethylhexyl)Phthalate	100	U
Di-n-octylphthalate	100	U
Benzo(b)Fluoranthene	100	U
Benzo(k)Fluoranthene	100	U
Benzo(a)Pyrene	100	U
Indeno(1,2,3-cd)Pyrene	100	U
Dibenz(a,h)Anthracene	100	U
Benzo(g,h,i)Perylene	100	U

Analyst: Ellen Mills

Group Leader: [signature]

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GC/MS ANALYTICAL REPORT
SEMIVOLATILE ORGANICS

Work Order No: 2376

Date Extracted: 11/07/90

Laboratory ID: 2376-09

Date Analyzed: 11/21/90

Client ID: GROUPII_B

% Moisture: NA

Matrix: TCLP

Level: LOW

Dilution Fact: 10.0

Compound	Analytical Results ug/L
N-Nitroso-Dimethylamine	100 U
Phenol	100 U
bis(2-Chloroethyl)ether	100 U
2-Chlorophenol	100 U
1,3-Dichlorobenzene	100 U
1,4-Dichlorobenzene	100 U
Benzyl Alcohol	100 U
1,2-Dichlorobenzene	100 U
2-Methylphenol	100 U
bis(2-chloroisopropyl)Ether	100 U
4-Methylphenol	100 U
N-Nitroso-Di-n-Propylamine	100 U
Hexachloroethane	100 U
Nitrobenzene	100 U
Isophorone	100 U
2-Nitrophenol	100 U
2,4-Dimethylphenol	100 U
bis(2-Chloroethoxy)methane	100 U
2,4-Dichlorophenol	100 U
Benzoic Acid	500 U
1,2,4-Trichlorobenzene	100 U
Naphthalene	100 U
4-Chloroaniline	100 U
Hexachlorobutadiene	100 U
4-Chloro-3-Methylphenol	100 U
2-Methylnaphthalene	100 U
Hexachlorocyclopentadiene	100 U
2,4,6-Trichlorophenol	100 U
2,4,5-Trichlorophenol	500 U
2-Chloronaphthalene	100 U
2-Nitroaniline	500 U
Dimethylphthalate	100 U
Acenaphthylene	100 U
2,6-Dinitrotoluene	100 U
3-Nitroaniline	500 U
Acenaphthene	100 U
2,4-Dinitrophenol	500 U
Dibenzofuran	100 U
4-Nitrophenol	500 U

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GC/MS ANALYTICAL REPORT
SEMIVOLATILE ORGANICS

Work Order No: 2376

Date Extracted: 11/07/90

Laboratory ID: 2376-15

Date Analyzed: 11/20/90

Client ID: GROUPIII_B

% Moisture: NA

Matrix: TCLP

Level: LOW

Dilution Fact: 10.0

Compound	Analytical Results ug/L
N-Nitroso-Dimethylamine	100 U
Phenol	100 U
bis(2-Chloroethyl)ether	100 U
2-Chlorophenol	100 U
1,3-Dichlorobenzene	100 U
1,4-Dichlorobenzene	100 U
Benzyl Alcohol	100 U
1,2-Dichlorobenzene	100 U
2-Methylphenol	100 U
bis(2-chloroisopropyl)Ether	100 U
4-Methylphenol	100 U
N-Nitroso-Di-n-Propylamine	100 U
Hexachloroethane	100 U
Nitrobenzene	100 U
Isophorone	100 U
2-Nitrophenol	100 U
2,4-Dimethylphenol	100 U
bis(2-Chloroethoxy)methane	100 U
2,4-Dichlorophenol	100 U
Benzoic Acid	500 U
1,2,4-Trichlorobenzene	100 U
Naphthalene	100 U
4-Chloroaniline	100 U
Hexachlorobutadiene	100 U
4-Chloro-3-Methylphenol	100 U
2-Methylnaphthalene	100 U
Hexachlorocyclopentadiene	100 U
2,4,6-Trichlorophenol	100 U
2,4,5-Trichlorophenol	500 U
2-Chloronaphthalene	100 U
2-Nitroaniline	500 U
Dimethylphthalate	100 U
Acenaphthylene	100 U
2,6-Dinitrotoluene	100 U
3-Nitroaniline	500 U
Acenaphthene	100 U
2,4-Dinitrophenol	500 U
Dibenzofuran	100 U
4-Nitrophenol	500 U

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GC/MS ANALYTICAL REPORT
SEMIVOLATILE ORGANICS

ork Order No: 2376

Date Extracted: 11/07/90

aboratory ID: 2376-15

Date Analyzed: 11/20/90

Client ID: GROUPIII_B

% Moisture: NA

Matrix: TCLP

Level: LOW

Dilution Fact: 10.0

Compound	Analytical Results ug/L
2,4-Dinitrotoluene	100 U
Fluorene	100 U
Diethylphthalate	100 U
4-Chlorophenyl-phenylether	100 U
4-Nitroaniline	500 U
4,6-Dinitro-2-Methylphenol	500 U
N-Nitrosodiphenylamine	100 U
4-Bromophenyl-phenylether	100 U
Hexachlorobenzene	100 U
Pentachlorophenol	500 U
Phenanthrene	100 U
Anthracene	100 U
Di-n-Butylphthalate	100 U
Fluoranthene	100 U
Pyrene	100 U
Butylbenzylphthalate	100 U
Benzo(a)Anthracene	100 U
3,3'-Dichlorobenzidine	200 U
Chrysene	100 U
bis(2-Ethylhexyl)Phthalate	100 U
Di-n-octylphthalate	100 U
Benzo(b)Fluoranthene	100 U
Benzo(k)Fluoranthene	100 U
Benzo(a)Pyrene	100 U
Indeno(1,2,3-cd)Pyrene	100 U
Dibenz(a,h)Anthracene	100 U
Benzo(g,h,i)Perylene	100 U

Analyst: Ellen Mills

Group Leader: [illegible]

ES-ENGINEERING SCIENCE, INC.

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GC/MS ANALYTICAL REPORT
SEMIVOLATILE ORGANICS

Work Order No: 2376

Date Extracted: 11/07/90

Laboratory ID: 2376-18

Date Analyzed: 11/20/90

Client ID: GROUPIII_C

% Moisture: NA

Matrix: TCLP

Level: LOW

Dilution Fact: 10.0

Compound	Analytical Results ug/L
N-Nitroso-Dimethylamine	100 U
Phenol	100 U
bis(2-Chloroethyl)ether	100 U
2-Chlorophenol	100 U
1,3-Dichlorobenzene	100 U
1,4-Dichlorobenzene	100 U
Benzyl Alcohol	100 U
1,2-Dichlorobenzene	100 U
2-Methylphenol	100 U
bis(2-chloroisopropyl)Ether	100 U
4-Methylphenol	100 U
N-Nitroso-Di-n-Propylamine	100 U
Hexachloroethane	100 U
Nitrobenzene	100 U
Isophorone	100 U
2-Nitrophenol	100 U
2,4-Dimethylphenol	100 U
bis(2-Chloroethoxy)methane	100 U
2,4-Dichlorophenol	100 U
Benzoic Acid	500 U
1,2,4-Trichlorobenzene	100 U
Naphthalene	100 U
4-Chloroaniline	100 U
Hexachlorobutadiene	100 U
4-Chloro-3-Methylphenol	100 U
2-Methylnaphthalene	100 U
Hexachlorocyclopentadiene	100 U
2,4,6-Trichlorophenol	100 U
2,4,5-Trichlorophenol	500 U
2-Chloronaphthalene	100 U
2-Nitroaniline	500 U
Dimethylphthalate	100 U
Acenaphthylene	100 U
2,6-Dinitrotoluene	100 U
3-Nitroaniline	500 U
Acenaphthene	100 U
2,4-Dinitrophenol	500 U
Dibenzofuran	100 U
4-Nitrophenol	500 U

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GC/MS ANALYTICAL REPORT
SEMIVOLATILE ORGANICS

ork Order No: 2376

Date Extracted: 11/07/90

aboratory ID: 2376-18

Date Analyzed: 11/20/90

Client ID: GROUPIII_C

% Moisture: NA

Matrix: TCLP

Level:LOW

Dilution Fact: 10.0

Compound	Analytical Results ug/L
2,4-Dinitrotoluene	100 U
Fluorene	100 U
Diethylphthalate	100 U
4-Chlorophenyl-phenylether	100 U
4-Nitroaniline	500 U
4,6-Dinitro-2-Methylphenol	500 U
N-Nitrosodiphenylamine	100 U
4-Bromophenyl-phenylether	100 U
Hexachlorobenzene	100 U
Pentachlorophenol	500 U
Phenanthrene	100 U
Anthracene	100 U
Di-n-Butylphthalate	100 U
Fluoranthene	100 U
Pyrene	100 U
Butylbenzylphthalate	100 U
Benzo(a)Anthracene	100 U
3,3'-Dichlorobenzidine	200 U
Chrysene	100 U
bis(2-Ethylhexyl)Phthalate	100 U
Di-n-octylphthalate	100 U
Benzo(b)Fluoranthene	100 U
Benzo(k)Fluoranthene	100 U
Benzo(a)Pyrene	100 U
Indeno(1,2,3-cd)Pyrene	100 U
Dibenz(a,h)Anthracene	100 U
Benzo(g,h,i)Perylene	100 U

Analyst: Ellen Mills

Group Leader: [illegible signature]

ES-ENGINEERING SCIENCE, INC.

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GC/MS ANALYTICAL REPORT
SEMIVOLATILE ORGANICS

Work Order No: 2376 Date Extracted: 11/07/90

Laboratory ID: 2376-21 Date Analyzed: 11/20/90

Client ID: GROUPIII_D % Moisture: NA

Matrix: TCLP Level:LOW Dilution Fact: 10.0

Compound	Analytical Results ug/L
N-Nitroso-Dimethylamine	100 U
Phenol	100 U
bis(2-Chloroethyl)ether	100 U
2-Chlorophenol	100 U
1,3-Dichlorobenzene	100 U
1,4-Dichlorobenzene	100 U
Benzyl Alcohol	100 U
1,2-Dichlorobenzene	100 U
2-Methylphenol	100 U
bis(2-chloroisopropyl)Ether	100 U
4-Methylphenol	100 U
N-Nitroso-Di-n-Propylamine	100 U
Hexachloroethane	100 U
Nitrobenzene	100 U
Isophorone	100 U
2-Nitrophenol	100 U
2,4-Dimethylphenol	100 U
bis(2-Chloroethoxy)methane	100 U
2,4-Dichlorophenol	100 U
Benzoic Acid	500 U
1,2,4-Trichlorobenzene	100 U
Naphthalene	100 U
4-Chloroaniline	100 U
Hexachlorobutadiene	100 U
4-Chloro-3-Methylphenol	100 U
2-Methylnaphthalene	100 U
Hexachlorocyclopentadiene	100 U
2,4,6-Trichlorophenol	100 U
2,4,5-Trichlorophenol	500 U
2-Chloronaphthalene	100 U
2-Nitroaniline	500 U
Dimethylphthalate	100 U
Acenaphthylene	100 U
2,6-Dinitrotoluene	100 U
3-Nitroaniline	500 U
Acenaphthene	100 U
2,4-Dinitrophenol	500 U
Dibenzofuran	100 U
4-Nitrophenol	500 U

-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley, CA. 94710

GC/MS ANALYTICAL REPORT
SEMIVOLATILE ORGANICS

rk Order No: 2376 | Date Extracted: 11/07/90

boratory ID: 2376-21 | Date Analyzed: 11/20/90

Client ID: GROUPIII_D | % Moisture: NA

Matrix: TCLP | Level: LOW | Dilution Fact: 10.0

Compound	Analytical Results ug/L
2,4-Dinitrotoluene	100 U
Fluorene	100 U
Diethylphthalate	100 U
4-Chlorophenyl-phenylether	100 U
4-Nitroaniline	500 U
4,6-Dinitro-2-Methylphenol	500 U
N-Nitrosodiphenylamine	100 U
4-Bromophenyl-phenylether	100 U
Hexachlorobenzene	100 U
Pentachlorophenol	500 U
Phenanthrene	100 U
Anthracene	100 U
Di-n-Butylphthalate	100 U
Fluoranthene	100 U
Pyrene	100 U
Butylbenzylphthalate	100 U
Benzo(a)Anthracene	100 U
3,3'-Dichlorobenzidine	200 U
Chrysene	100 U
bis(2-Ethylhexyl)Phthalate	100 U
Di-n-octylphthalate	100 U
Benzo(b)Fluoranthene	100 U
Benzo(k)Fluoranthene	100 U
Benzo(a)Pyrene	100 U
Indeno(1,2,3-cd)Pyrene	100 U
Dibenz(a,h)Anthracene	100 U
Benzo(g,h,i)Perylene	100 U

nalyst: Ellen Mills

Group Leader: Richard Ward

ES-ENGINEERING-SCIENCE, INC.

600 Bancroft Way
Berkeley, CA 94710

INORGANICS ANALYTICAL REPORT

Client: ES-Austin
Project: Great Falls SI

Work Order: 2376
Matrix: TCLP

Client's ID:	Group IA TLCP Extract 0900	Group IIA TLCP Extract 0930	Group IIB TLCP Extract 0945
Date Sampled:	10/26/90	10/26/90	10/26/90
Date Received:	10/27/90	10/27/90	10/27/90
% Solids:	NA	NA	NA
Lab ID:	2376.03 B	2376.06 B	2376.09 B

Parameter	Results						Method	Units	Date Analyzed
Arsenic	1.3	B	8.1	B	3.1	B	GF-AA	ug/L	11/16/90
Barium	959.		2070.		627.		ICP	(PPB)	11/15/90
Cadmium	3.0	B	2.0	B	2.0	U	ICP	in	11/15/90
Chromium	9.1	U	9.1	U	9.1	U	ICP	Water	11/15/90
Lead	.94	BNW	7.0	BN	31.6	NS	GF-AA	"	11/15/90
Mercury	.10	U	.10	U	.68		CV-AA	"	11/28/90
Selenium	1.5	UW	1.5	UW	1.5	UW	GF-AA	"	11/21/90
Silver	8.2	U	8.2	U	8.2	U	ICP	"	11/15/90

ND- Not Detected

ANALYST: J Michael

GROUP LEADER: [signature]

ES-ENGINEERING-SCIENCE, INC.

600 Bancroft Way
Berkeley, CA 94710

INORGANICS ANALYTICAL REPORT

Client: ES-Austin
Project: Great Falls SI

Work Order: 2376
Matrix: TCLP

Client's ID:	Group IIIA TLCP Extract 1000	Group IIIB TLCP Extract 1015	Group IIIC TLCP Extract 1030
Date Sampled:	10/26/90	10/26/90	10/26/90
Date Received:	10/27/90	10/27/90	10/27/90
% Solids:	NA	NA	NA
Lab ID:	2376.12 B	2376.15 B	2376.18 B

Parameter	Results						Method	Units	Date Analyzed
Arsenic	4.1	B	1.0	U	1.0	U	GF-AA	ug/L	11/19/90
Barium	1830.		627.		1890.		ICP	(PPB)	11/15/90
Cadmium	2.0	B	3.0	B	2.0	U	ICP	in	11/15/90
Chromium	9.1	U	9.1	U	9.1	U	ICP	Water	11/15/90
Lead	6.5	N	.50	UNW	8.0	BN	GF-AA	"	11/15/90
Mercury	.10	U	.11	B	.86		CV-AA	"	11/28/90
Selenium	1.5	UW	1.5	UW	1.5	UW	GF-AA	"	11/21/90
Silver	8.2	U	8.2	U	8.2	U	ICP	"	11/15/90

ND- Not Detected

ANALYST: J. Michiel

GROUP LEADER: [signature]

ES-ENGINEERING-SCIENCE, INC.

600 Bancroft Way
Berkeley, CA 94710

INORGANICS ANALYTICAL REPORT

Client:	ES-Austin		Work Order:	2376
Project:	Great Falls SI		Matrix:	TCLP

Client's ID:	Group IIID TLCP Extract 1045	TCLP Blank Fluid #2	TCLP Blank Fluid #1
Date Sampled:	10/26/90		
Date Received:	10/27/90		
% Solids:	NA	NA	NA
Lab ID:	2376.21 B	2376.98 B	2376.99 B

Parameter	Results						Method	Units	Date Analyzed
Arsenic	1.1	B	1.0	U	1.0	U	GF-AA	ug/L	11/19/90
Barium	1320.		30.0	B	32.0	B	ICP	(PPB)	11/15/90
Cadmium	2.0	U	2.0	U	2.0	U	ICP	in	11/15/90
Chromium	9.1	U	9.1	U	9.1	U	ICP	Water	11/15/90
Lead	10.0	BN	3.1	N	.50	UNW	GF-AA	"	11/16/90
Mercury	.19	B	.10	U	.10	U	CV-AA	"	11/28/90
Selenium	1.5	UW	1.5	U	1.5	UW	GF-AA	"	11/21/90
Silver	8.2	U	8.2	U	8.2	U	ICP	"	11/15/90

ND- Not Detected

ANALYST: J. Michied

GROUP LEADER: [signature]

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley,CA 94710

ORGANIC ANALYTICAL REPORT

Work Order NO.: 2376

Matrix: Soil

Parameter: TPH

Unit: mg/Kg

Analytical Method: 418.1

Date Extracted: 11/01/90

QC Batch NO.: S90QCB031TPH

Date Analyzed: 11/02/90

Sample ID:	Client ID:	Result	Reporting Limit	Percent Moisture
2376-01	GROUP I-A	70	14	26.9
2376-04	GROUP II-A	ND	10	3.3
2376-07	GROUP II-B	ND	12	18.4
2376-10	GROUP III-A	ND	11	12.2
2376-13	GROUP III-B	56	12	16.2
2376-16	GROUP III-C	ND	11	7.2
2376-19	GROUP III-D	150	11	8.5
MSTPH901101 (BLANK)	NA	ND	10	NA

NA_ Not Analyzed
ND_ Not Detected

ANALYST: David B.

GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley, CA 94710

ORGANIC ANALYTICAL REPORT

Work Order NO.: 2668

Parameter: TPH

Matrix: Water

Analytical Method: 418.1

Unit: mg/L

QC Batch NO.: W91QCB006TPH

Date Extracted: 03/01/91

Sample ID:	Client ID:	Result	Reporting Limit	Date Analyzed
2668-01	EQUIP. RINSATE #19	ND	1	03/06/91
2668-03	FIELD BLANK HPLC WATER	ND	1	03/06/91
2668-04	FIELD BLANK DI WATER	ND	1	03/06/91
2668-05	MANG-0-MW1	ND	1	03/06/91
2668-06	MANG-1-MW1	ND	1	03/06/91
2668-07	MANG-2-MW1	ND	1	03/06/91
2668-08	MANG-3-MW1	ND	1	03/06/91
2668-09	MANG-4-MW1	ND	1	03/06/91
2668-10	MANG-4-MW1A	ND	1	03/06/91
2668-15	HOLDING TANK	ND	1	03/06/91
MWTPH910301 (BLANK)	NA	ND	1	03/06/91

NA_ Not Analyzed
ND_ Not Detected

ANALYST: ------------------

GROUP LEADER: ------------------

Appendix D

Geological Data

D.1 Piezometers
D.2 Soil Borings
D.3 Monitoring Wells

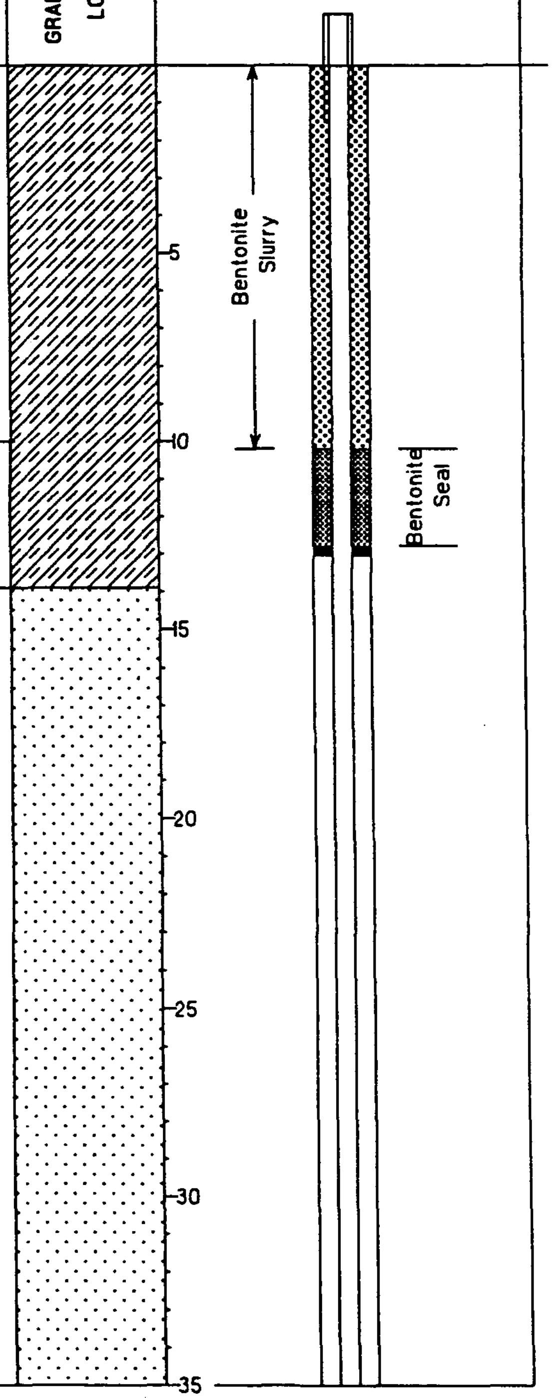
D.1 Piezometers

PIEZOMETER COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG- (1-2)-P1
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 9/15/90
SITE- 1-2	WELL DEPTH (ft)- 62 BGL
GROUND ELEVATION (ft-MSL)- 3651.16 MSL	DEPTH TO WATER (ft)- 43.1
TOC ELEVATION (ft)- 3653.54 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- G. Pierson	SCREEN MATERIAL- same 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION
0		SILTY CLAY with weathered sandstone layers
10		weathered SANDSTONE, brown-red, fine to medium grained
15		SANDSTONE, brown-red, fine to medium grained, iron staining, poorly indurated, horizontal fractures. CLAY, gray to red-brown, plastic, stiff. SANDSTONE, gray, hard, well indurated, crystalline. SANDSTONE, same as (13.9-17.1')
30		SANDSTONE, same as (13.9'-17.1') but with occasional vug.
35		

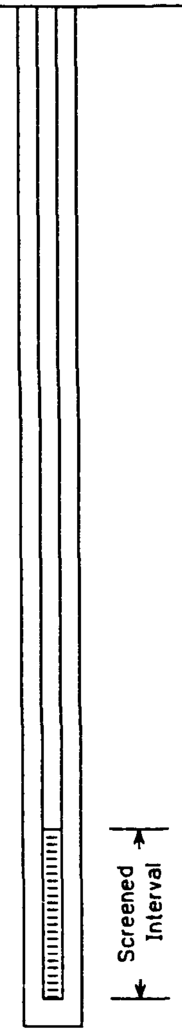
GRAPHIC LOG / WELL DIAGRAM



PIEZOMETER COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG- (1-2)-P1
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 9/15/90
SITE- 1-2	WELL DEPTH (ft)- 62 BGL
GROUND ELEVATION (ft-MSL)- 3651.16 MSL	DEPTH TO WATER (ft)- 43.1
TOC ELEVATION (ft)- 3653.54 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- G. Pierson	SCREEN MATERIAL- same 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION	GRAPHIC LOG	WELL DIAGRAM
35				
40		SANDSTONE, brown-red, fine to medium grained with some interbedded coarse grains, iron staining, vugs, horizontal fractures; layer of very hard, gray, crystalline, sandstone; bottom foot of core is somewhat mottled.		
45				
50				
55		Same as above; mottling appear to be the gray sandstone.		
		SANDSTONE, dark gray, mottled with light gray sandstone, vugs, laminated layers of shale.		
60				
		Total Depth = 62'		
65				
70				

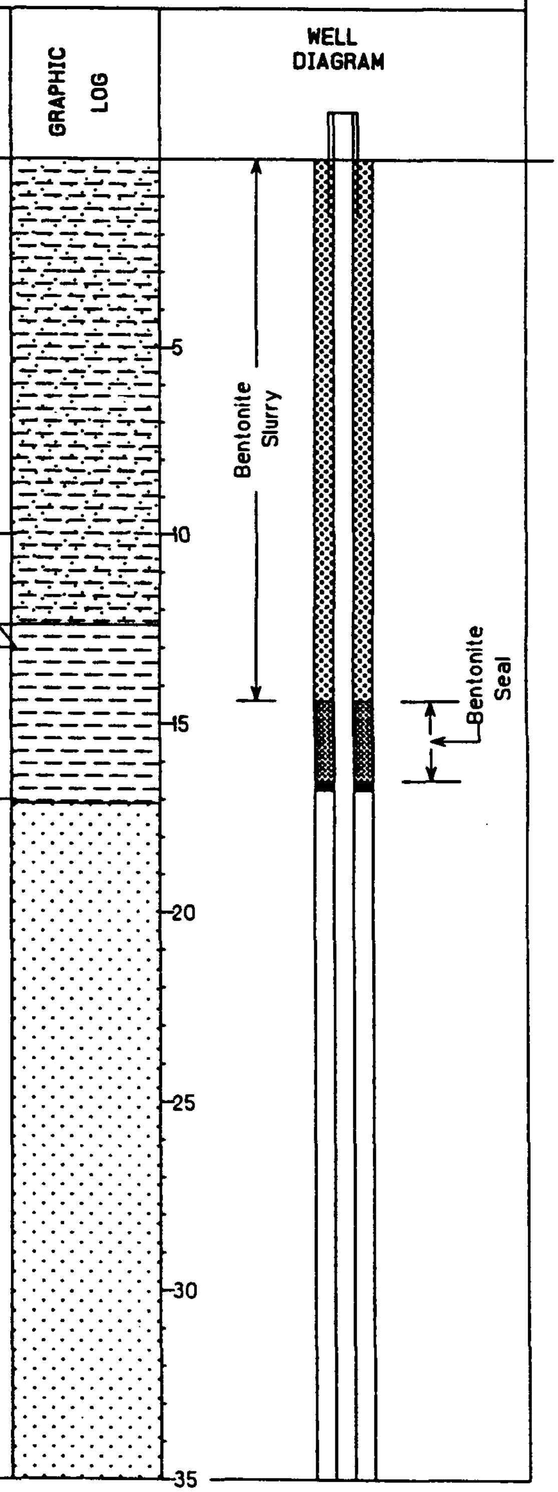


PIEZOMETER COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG- (1-2)-P2
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 9/17/90
SITE- 1-2	WELL DEPTH (ft)- 62 BGL
GROUND ELEVATION (ft-MSL)- 3650.95 MSL	DEPTH TO WATER (ft)- 43.4
TOC ELEVATION (ft)- 3653.70 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- G. Pierson	SCREEN MATERIAL- same 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION
0		Alternating layers of weathered sandstones, sands and clays.
10	X	SANDSTONE, brown-red, fine to medium grained, hard poorly indurated, fractured, iron staining.
	X	CLAY, tan, plastic, stiff, slightly sandy.
	X	SANDSTONE, brown-red, fine to medium grained, hard, poorly indurated, fractured, iron staining.
	X	SANDSTONE, same as above but not nearly as fractured (at 32'-47' BGL)
35		

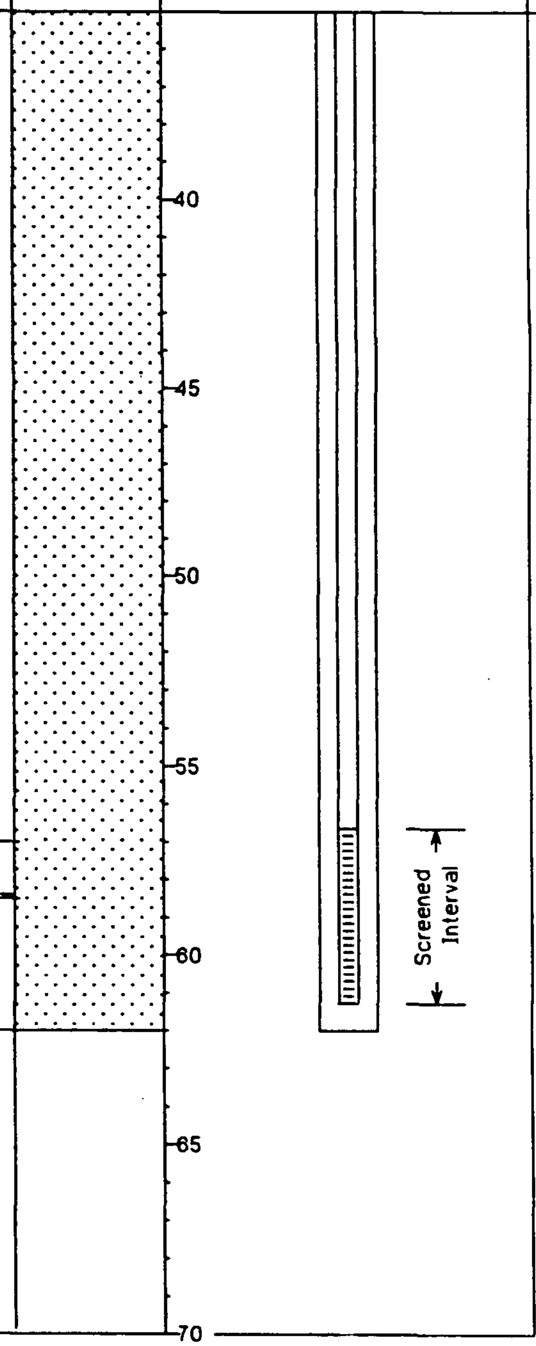
GRAPHIC LOG / WELL DIAGRAM



PIEZCMETER COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG- (1-2)-P2
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 9/17/90
SITE- 1-2	WELL DEPTH (ft)- 62 BGL
GROUND ELEVATION (ft-MSL)- 3650.95 MSL	DEPTH TO WATER (ft)- 43.4
TOC ELEVATION (ft)- 3653.70 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 8	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- G. Pierson	SCREEN MATERIAL- same 0.020" slots

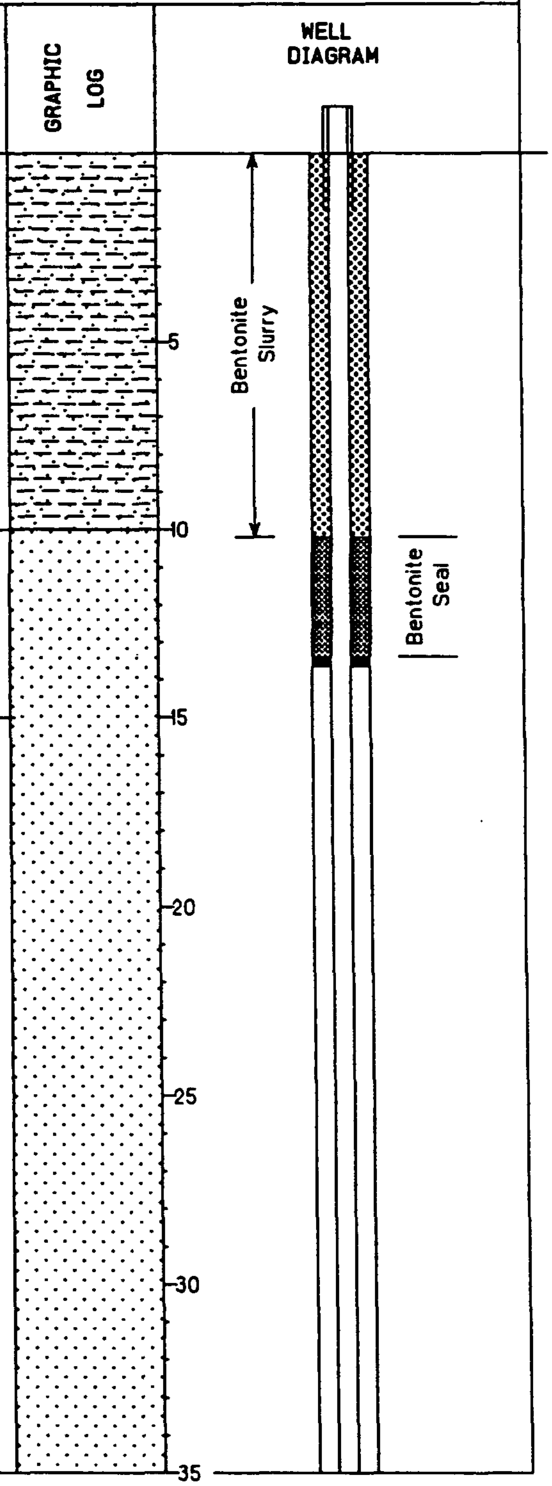
DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION	GRAPHIC LOG	WELL DIAGRAM
35–47	X			
47–57	X	SANDSTONE, same as above with few 0.2' thick, hard, crystalline, gray sandstone layers.		
57–58.5	X	SANDSTONE, tan and gray mottled, hard, poorly indurated.		
58.5–62	X	SANDSTONE, dark gray, shaly, light gray mottling, trace of pyrite and thin coal stringers.		
62		*Total Depth = 62'*		



PIEZOMETER COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-(1-2)-P3
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 9/18/90
SITE- 1-2	WELL DEPTH (ft)- 60.1 BGL
GROUND ELEVATION (ft-MSL)- 3650.21 MSL	DEPTH TO WATER (ft)- 44.2
TOC ELEVATION (ft)- 3652.48 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- J. Bauer	SCREEN MATERIAL- same 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION
0–10		Alternating layers of weathered sandstones, sands and clays.
10–15	X	SANDSTONE, red-brown, weathered, iron staining, interlayers of tan-gray, stiff clay.
15–30	X	SANDSTONE, brown-red, hard, poorly indurated, fine to medium grained with some scattered hard, coarse, grayish sandstone layers.
30–35	X	SANDSTONE, same as above with some vugs appearing at 41'.

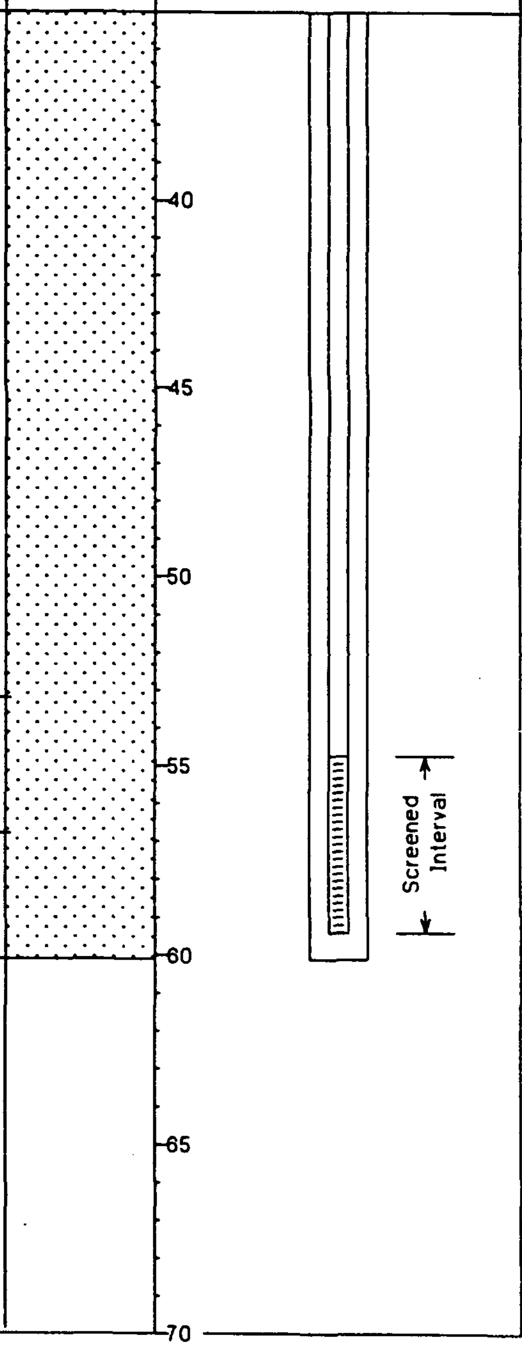


PIEZOMETER COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG- (1-2)-P3
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 9/18/90
SITE- 1-2	WELL DEPTH (ft)- 60.1 BGL
GROUND ELEVATION (ft-MSL)- 3650.21 MSL	DEPTH TO WATER (ft)- 44.2
TOC ELEVATION (ft)- 3652.48 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- J. Bauer	SCREEN MATERIAL- same 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION
35		
40		
45		SANDSTONE, same as above with 0.3' well indurated, hard, coarse grain layer of gray sandstone at 50.8'.
50		
		SANDSTONE, tan-gray, mottled, fine to medium grained, poorly indurated, few coal stringers.
55		
		SANDSTONE, light to dark gray, fine to medium grained, shaly, hard, competent.
60		*Total Depth = 60.1'*
65		
70		

GRAPHIC LOG / WELL DIAGRAM



PIEZOMETER COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG- (1-2)-P4
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 9/18/90
SITE- 1-2	WELL DEPTH (ft)- 54.1 BGL
GROUND ELEVATION (ft-MSL)- 3654.04 MSL	DEPTH TO WATER (ft)- 43.26
TOC ELEVATION (ft)- 3656.02 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- J. Bauer	SCREEN MATERIAL- same 0.020" slots

DEPTH (FEET) | SAMPLE | MATERIAL DESCRIPTION | GRAPHIC LOG | WELL DIAGRAM

0

Alternating layers of weathered sandstones, sands and clays.

5

10

SANDSTONE, soft, very weathered.

15

SANDSTONE, same as above.

CLAY, tan, very plastic, stiff.

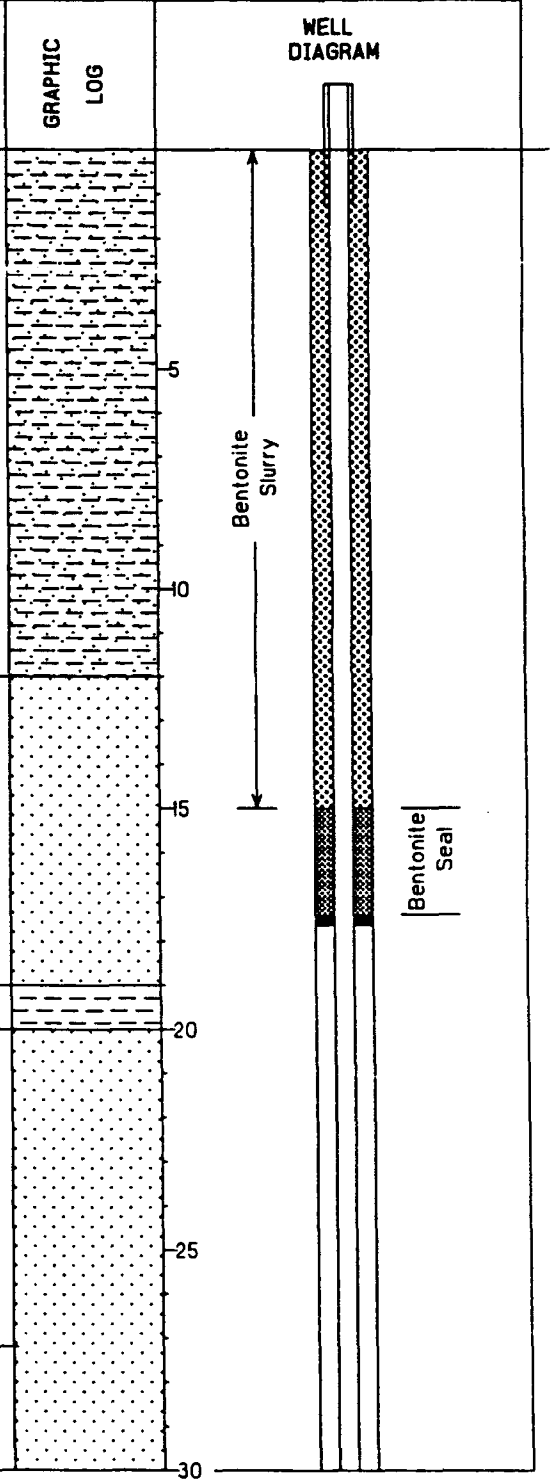
20

SANDSTONE, brown-red, hard, indurated, fine to medium grained, iron stains.

25

SANDSTONE, brown-red, fine to medium grained, hard, poorly indurated, some fractures.

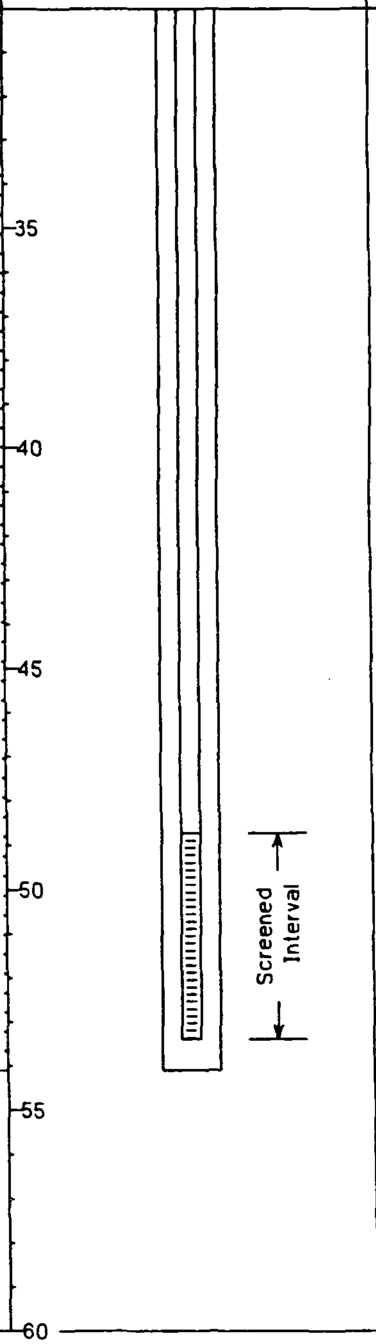
30



PIEZOMETER COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG- (1-2)-P4
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 9/18/90
SITE- 1-2	WELL DEPTH (ft)- 54.1 BGL
GROUND ELEVATION (ft-MSL)- 3654.04 MSL	DEPTH TO WATER (ft)- 43.26
TOC ELEVATION (ft)- 3656.02 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- J. Bauer	SCREEN MATERIAL- same 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION	GRAPHIC LOG	WELL DIAGRAM
30				
35		(34'-44') SANDSTONE, same as above.		
40				
45		SANDSTONE, light gray, very hard, well indurated, fine to medium grained.		
		SANDSTONE, same as above.		
50		SANDSTONE, brown-red, fine to medium grained, poorly indurated, black specs, few vugs.		
55		*Total Depth = 54.1'*		
60				

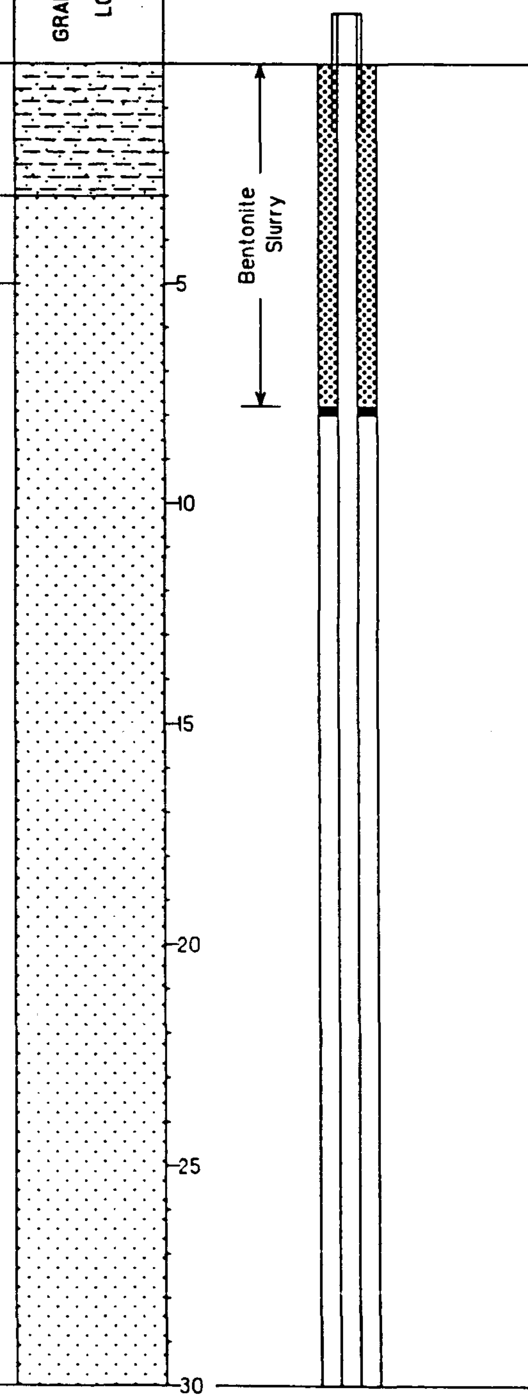


PIEZOMETER COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-3-P1
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 9/19/90
SITE- 3	WELL DEPTH (ft)- 55 BGL
GROUND ELEVATION (ft-MSL)- 3637.74 MSL	DEPTH TO WATER (ft)- 36.64
TOC ELEVATION (ft)- 3639.90 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- J. Bauer	SCREEN MATERIAL- same 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION
0		SOIL, sandy and clayey.
		SANDSTONE, weathered, brown-red, poorly indurated, broken.
5		SANDSTONE, brown-red, weathered, very broken, hard, poorly indurated, fine to medium grain.
10		
15		
20		SANDSTONE, same as above but with horizontal fractures and small vugs.
25		
30		

GRAPHIC LOG | WELL DIAGRAM



PIEZOMETER COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-3-P1
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 9/19/90
SITE- 3	WELL DEPTH (ft)- 55 BGL
GROUND ELEVATION (ft-MSL)- 3637.74 MSL	DEPTH TO WATER (ft)- 36.64
TOC ELEVATION (ft)- 3639.90 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- J. Bauer	SCREEN MATERIAL- same 0.020" slots

DEPTH (FEET) | SAMPLE | MATERIAL DESCRIPTION | GRAPHIC LOG | WELL DIAGRAM

30

SANDSTONE, same as above, but with lens of hard, gray, well indurated, crystalline, fine to medium grained sandstone.

35

SANDSTONE, brown-red with gary mottling, fine to medium grained, hard, poorly indurated, iron staining, horizontal fracturing.

40

SANDSTONE, light and dark gray streaks, hard, poorly indurated, some pyrite patches, few very weathered layers, shaly.

45

SANDSTONE, same as above but with more interbedded shale layers.

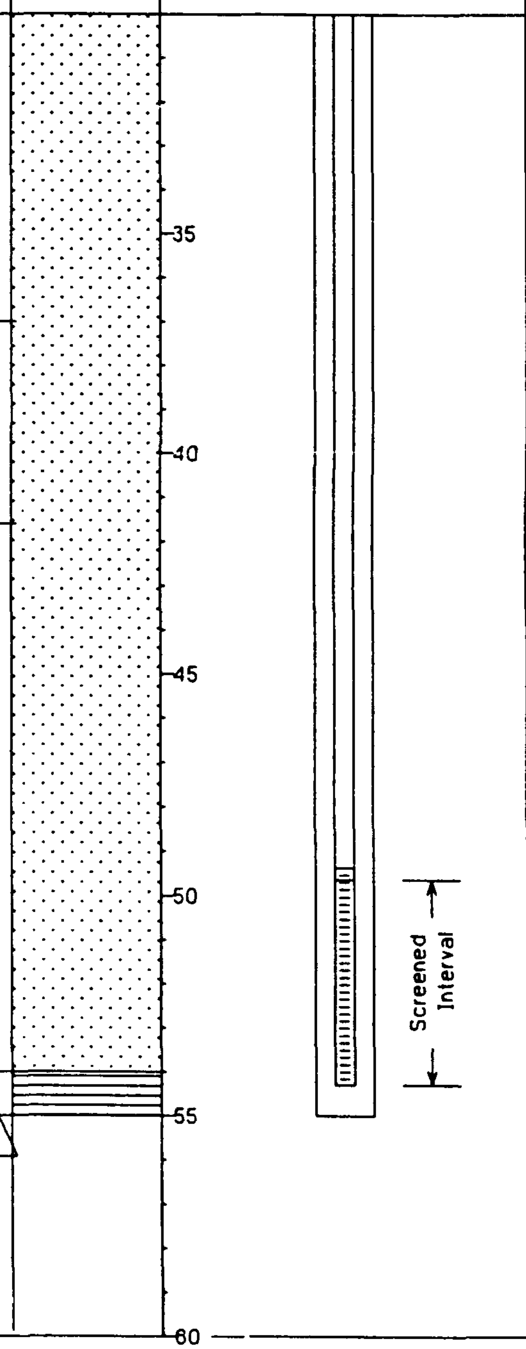
50

SHALE, dark gray, hard, fissile, some interbedded sanstones.

55

Total Depth = 55'

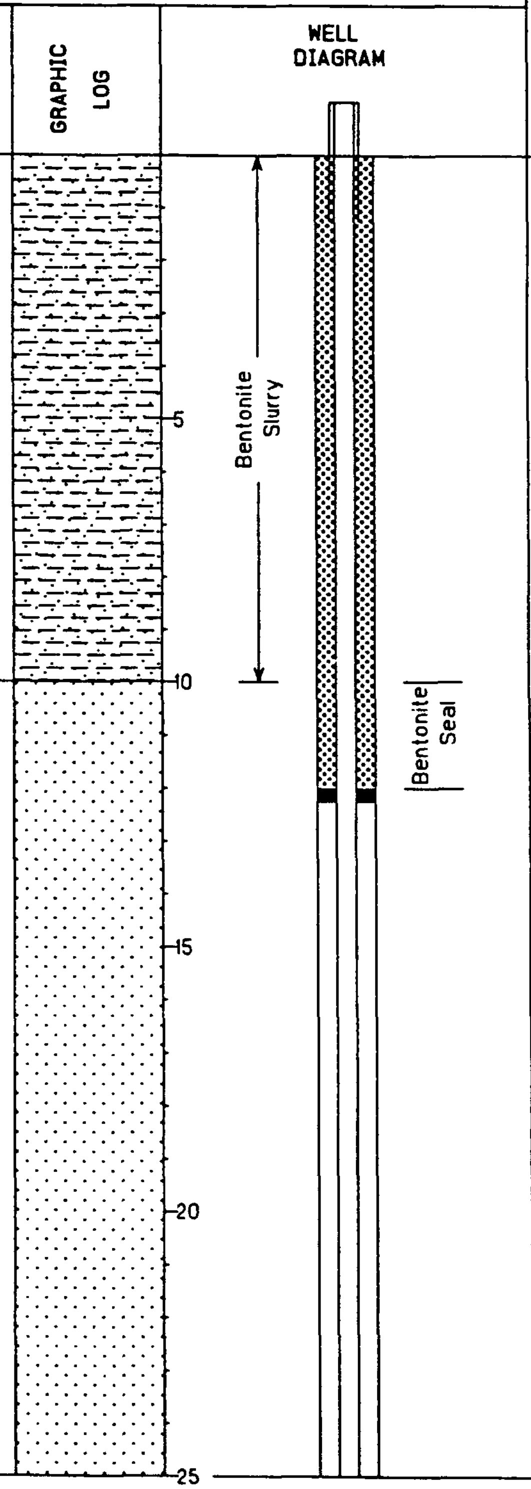
60



PIEZOMETER COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-3-P2
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 9/20/90
SITE- 3	WELL DEPTH (ft)- 43 BGL
GROUND ELEVATION (ft-MSL)- 3635.43 MSL	DEPTH TO WATER (ft)- 38.24
TOC ELEVATION (ft)- 3637.45 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- J. Bauer	SCREEN MATERIAL- same 0.020" slots

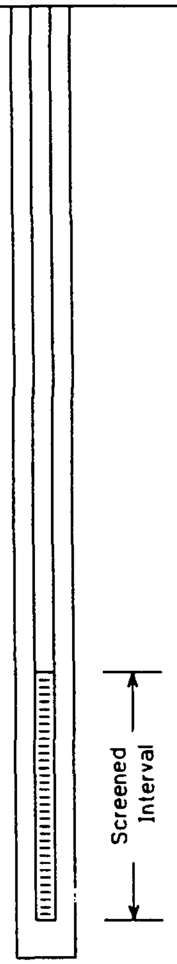
DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION
0		Alternating layers of weathered sandstones, clays and sands.
10		SANDSTONE, brown-red, fine to medium grain, hard, poorly indurated, some calcite laminae.
15		SANDSTONE, same as above but with horizontal fracturing, iron staining and small vugs.
20		
25		



PIEZOMETER COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-3-P2
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 9/20/90
SITE- 3	WELL DEPTH (ft)- 43 BGL
GROUND ELEVATION (ft-MSL)- 3635.43 MSL	DEPTH TO WATER (ft)- 38.24
TOC ELEVATION (ft)- 3637.45 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- J. Bauer	SCREEN MATERIAL- same 0.020" slots

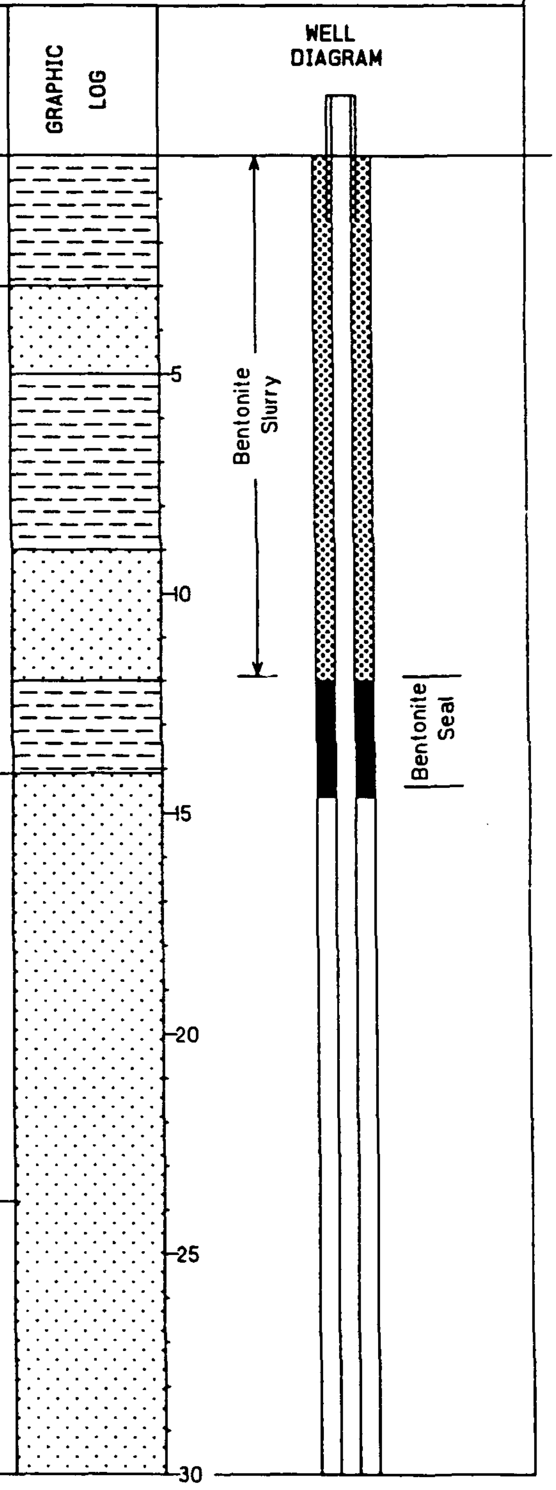
DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION	GRAPHIC LOG	WELL DIAGRAM
25				
		SANDSTONE, same as above but with light tan mottling.		
30			30	
		SANDSTONE, brown-red and gray interlayered, several fracyure zones, fine to medium grain, iron staining, thin (laminae) dark (organic) layers.		
35			35	
		SANDSTONE, light and dark gray mottled, hard, well indurated, fine to medium grain, few soft shaly layers.		
40			40	
		Total Depth = 43'		
45			45	
50			50	



PIEZOMETER COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-3-P3
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 9/21/90
SITE- 3	WELL DEPTH (ft)- 50.3 bgl
GROUND ELEVATION (ft-MSL)- 3636.64 MSL	DEPTH TO WATER (ft)- 39.25
TOC ELEVATION (ft)- 3639.03 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- J. Bauer	SCREEN MATERIAL- same 0.020" slots

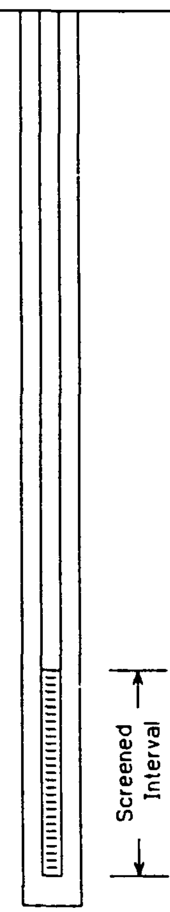
DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION
0		Clayey soil to 3', alternating layers of weathered sandstones and clays.
3		Alternating layers of waethered SANDSTONE and CLAY.
14		SANDSTONE, brown-red, fine to medium grain, hard, poorly indurated, broken.
		SANDSTONE, same as above but not broken, few horizontal fractures and small vugs.
24		SANDSTONE, brown-yellow, fine to medium grain, hard, poorly indurated, brittle.
		SANDSTONE, same as above.
30		



PIEZOMETER COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-3-P3
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 9/21/90
SITE- 3	WELL DEPTH (ft)- 50.3 bgl
GROUND ELEVATION (ft-MSL)- 3636.64 MSL	DEPTH TO WATER (ft)- 39.25
TOC ELEVATION (ft)- 3639.03 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- J. Bauer	SCREEN MATERIAL- same 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION	GRAPHIC LOG	WELL DIAGRAM
30				
		SANDSTONE, brown-red and gray mottled, fine to medium grain, very weathered, iron stains, black streaks.		
35			35	
40			40	
45		SANDSTONE, light and dark gray mottled, fine to medium grain, very weathered and broken, few shaly layers, hard, indurated.	45	
50		*Total Depth = 50.3'*	50	
55			55	
60			60	



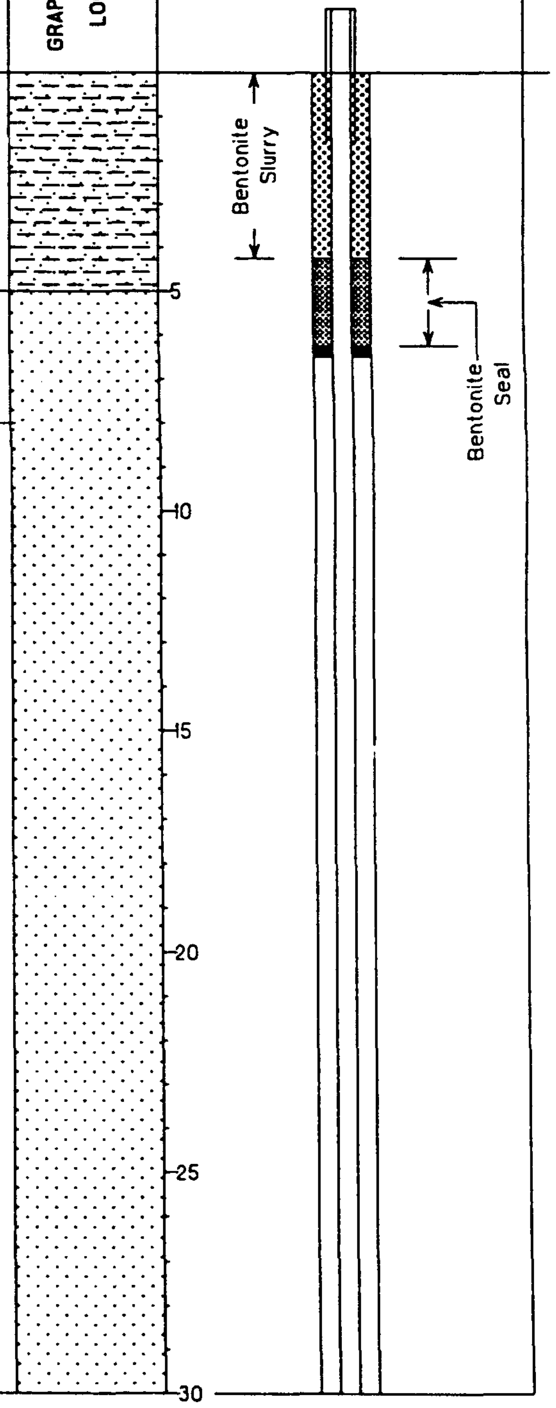
PIEZOMETER COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG- (4-8)-P1
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 9/11/90
SITE- 4-8	WELL DEPTH (ft)- 52.5 BGL
GROUND ELEVATION (ft-MSL)- 3678.37 MSL	DEPTH TO WATER (ft)- 41.98
TOC ELEVATION (ft)- 3680.82 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- G. Pierson	SCREEN MATERIAL- same 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION
0–5		Weathered layers of broken sandstones, clays and sands.
5	X	SANDSTONE, brown-red, weathered, iron-stained, fine-grained, poorly indurated, interbedded with 0.2' thick layers of gray, plastic, fissile clay.
10	X	SANDSTONE, brown-red, fine to medium, iron-staining, occasional vug, poorly indurated; some broken up weathered layers (< 0.2' thick) observed.
25	X	Same as above with no broken layers, a black, sooty, soft material deposited in some vugs, smears when touched, no odor.
30		

GRAPHIC LOG

WELL DIAGRAM

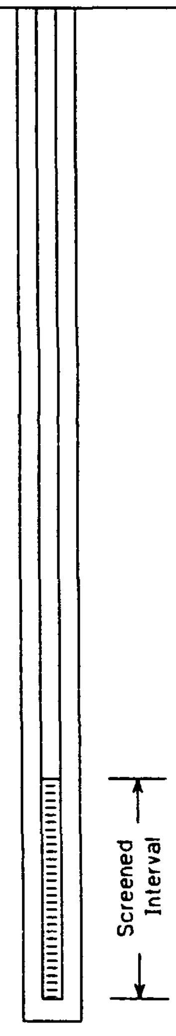


PIEZOMETER COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG- (4-8)-P1
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 9/11/90
SITE- 4-8	WELL DEPTH (ft)- 52.5 BGL
GROUND ELEVATION (ft-MSL)- 3678.37 MSL	DEPTH TO WATER (ft)- 41.98
TOC ELEVATION (ft)- 3680.82 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- G. Pierson	SCREEN MATERIAL- same 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION	GRAPHIC LOG
30			
35			35
		Same as above.	
40			40
		SANDSTONE, coarse, iron-stained, broken up.	
45			45
		SANDSTONE, dark gray, shaly with occasional laminate layer of coal; gradation zone 45.4'-46.5'.	
50			50
		Total Depth = 52.5'	
55			55
60			60

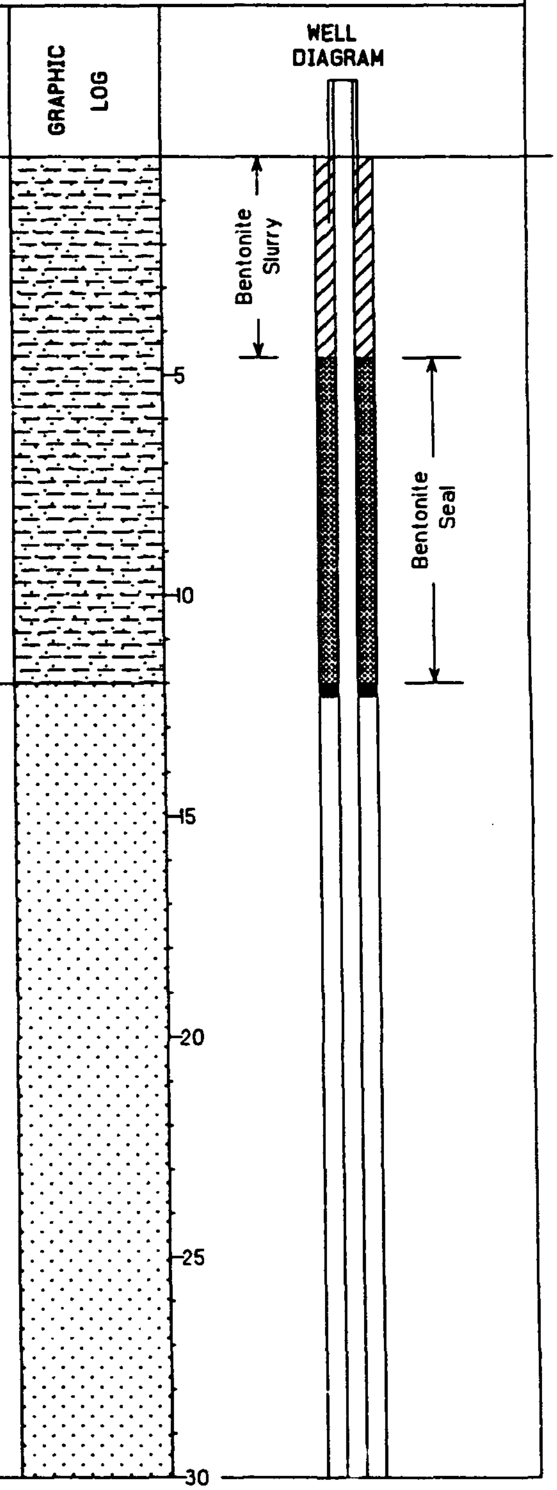
WELL DIAGRAM



PIEZOMETER COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG- (4-8)-P2
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 9/12/90
SITE- 4-8	WELL DEPTH (ft)- 53.70 BGL
GROUND ELEVATION (ft-MSL)- 3672.35 MSL	DEPTH TO WATER (ft)- 40.88
TOC ELEVATION (ft)- 3674.10 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- G. Pierson	SCREEN MATERIAL- same 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION
0		Weathered sandstones, sands and clay, all interbedded together in varying degrees of consolidation.
12	X	SANDSTONE, brown-red, fine to medium grained, horiz. fractures, poorly indurated, iron staining, last 4' broken up, sugary texture in places.
27	X	
30		

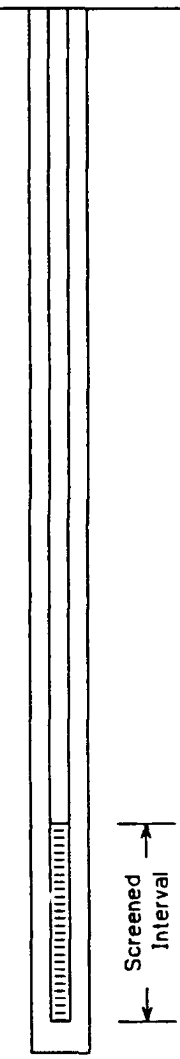


PIEZOMETER COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG- (4-8)-P2
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 9/12/90
SITE- 4-8	WELL DEPTH (ft)- 53.70 BGL
GROUND ELEVATION (ft-MSL)- 3672.35 MSL	DEPTH TO WATER (ft)- 40.88
TOC ELEVATION (ft)- 3674.10 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- G. Pierson	SCREEN MATERIAL- same 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION	GRAPHIC LOG
30		SANDSTONE, same as above with occasional vug and black sooty material at 29.5'.	
35			35
40			40
45			45
50		SANDSTONE, dark gray shaly.	50
		Total Depth = 53.7'	
55			55
60			60

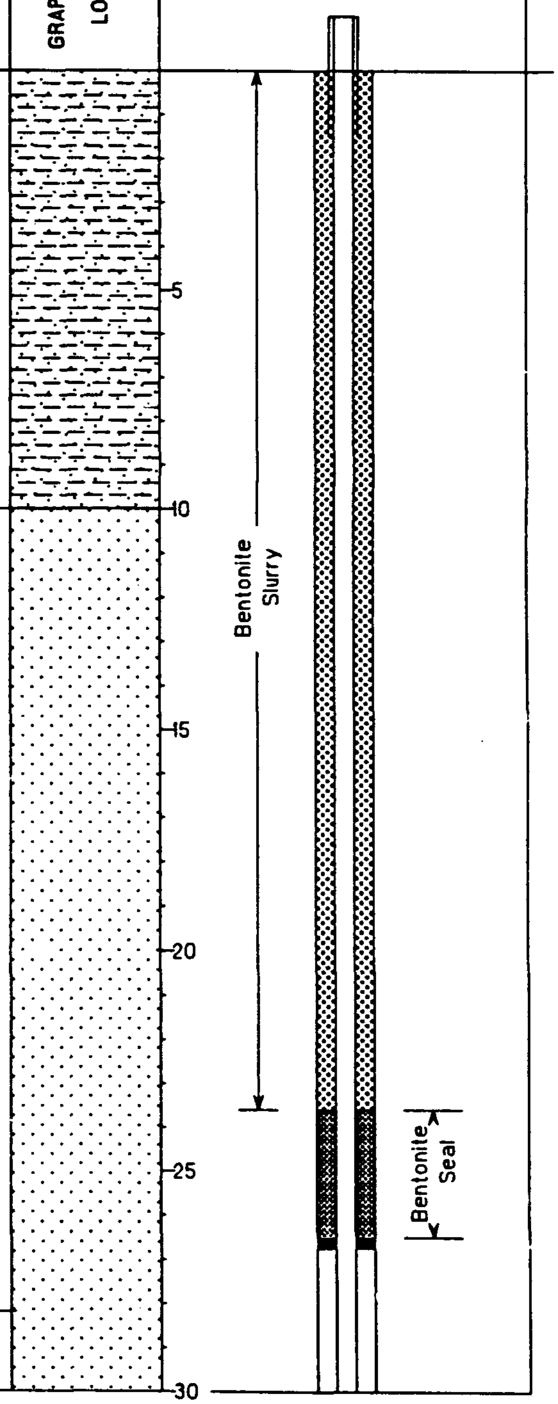
WELL DIAGRAM



PIEZOMETER COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG- (4-8)-P3
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 9/13/90
SITE- 4-8	WELL DEPTH (ft)- 51.3 BGL
GROUND ELEVATION (ft-MSL)- 3669.21 MSL	DEPTH TO WATER (ft)- 45.31
TOC ELEVATION (ft)- 3671.45 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- G. Pierson	SCREEN MATERIAL- same 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION	GRAPHIC LOG	WELL DIAGRAM
0		Intermittent layers of weathered sandstones, clayey sands and sandy clays.		
5				
10	X	SANDSTONE, brown-red, fine to medium grained, some iron staining, poorly indurated, horiz. fractures throughout.		
15				
20				
25	X	Same as above.		
		SANDSTONE, pink-tan to gray, very hard, well indurated, X line.		
30				



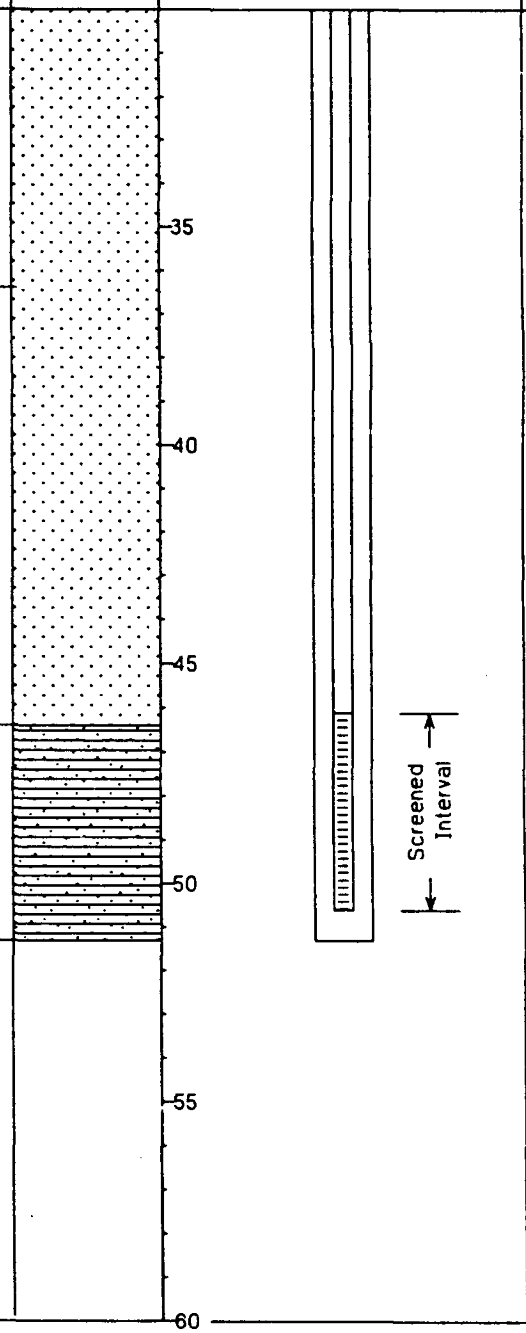
PIEZOMETER COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG- (4-8)-P3
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 9/13/90
SITE- 4-8	WELL DEPTH (ft)- 51.3 BGL
GROUND ELEVATION (ft-MSL)- 3669.21 MSL	DEPTH TO WATER (ft)- 45.31
TOC ELEVATION (ft)- 3671.45 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- G. Pierson	SCREEN MATERIAL- same 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION
30		horiz. and vertical fracturing, occasional vugs, some iron staining, siliceous cement.
		Same as above.
35		
		SANDSTONE, brown-pink, fine to medium grained with pockets of coarse grain, iron staining, horiz. fractures, poorly indurated.
40		
45		
		SHALE, very sandy, mottle gray with layers of brown and pinkish-brown that slump together, occasional coal seam.
50		
		Total depth = 51.3'
55		
60		

GRAPHIC LOG

WELL DIAGRAM

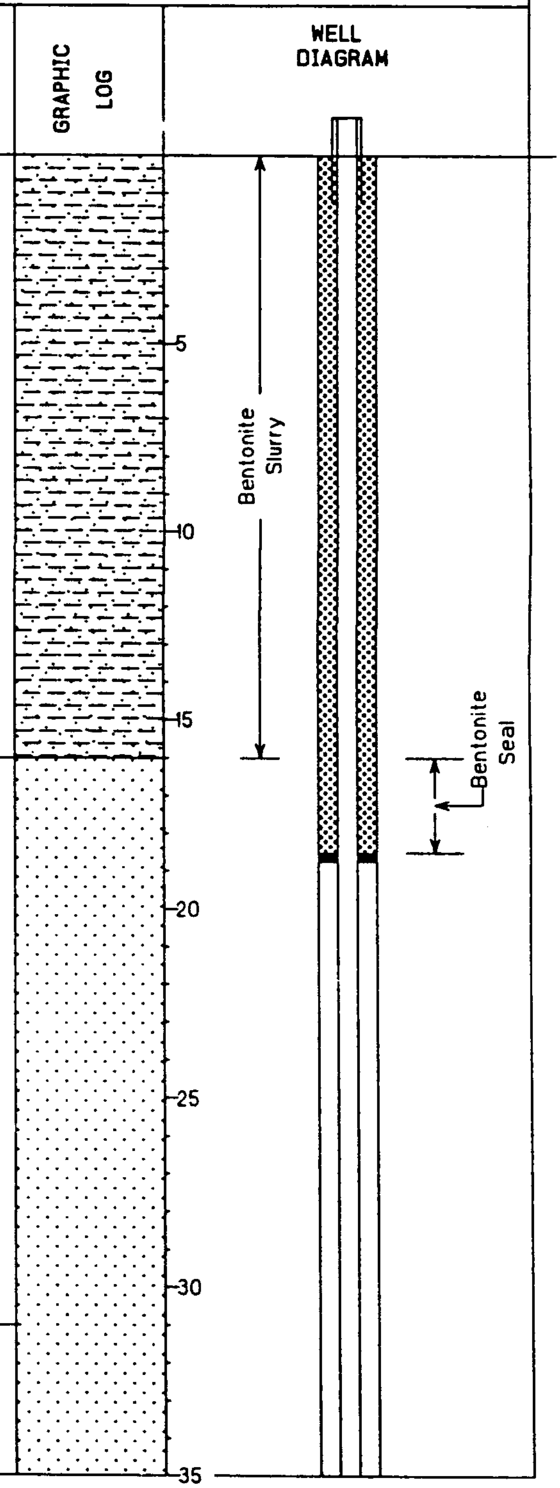


PIEZOMETER COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-(4-8)-P4
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 9/14/90
SITE- 4-8	WELL DEPTH (ft)- 61 BGL
GROUND ELEVATION (ft-MSL)- 3659.20 MSL	DEPTH TO WATER (ft)- 43.42
TOC ELEVATION (ft)- 3661.22 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- G. Pierson	SCREEN MATERIAL- same 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION
0		Weathered layers of sandstones, sands, and clays.
5		
10		
15		SANDSTONE, brown, fine to medium grained, iron staining, poorly indurated, horiz. fractures, occasional vug and calcite seam, broken up in places but predominantly competent.
20		
25		
30		SANDSTONE, same as above with occasional small pockets (< 1/16") of black, soft sooty (organic) material.
35		

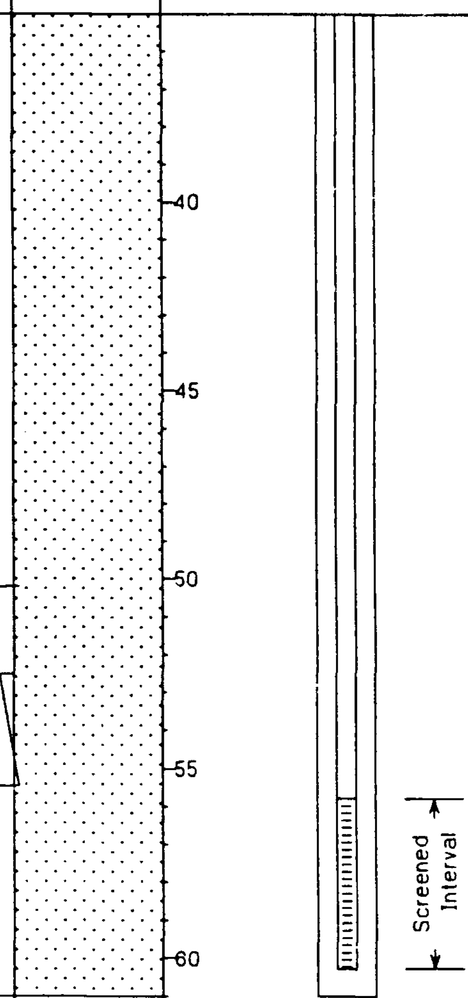
GRAPHIC LOG



PIEZOMETER COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG- (4-8)-P4
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 9/14/90
SITE- 4-8	WELL DEPTH (ft)- 61 BGL
GROUND ELEVATION (ft-MSL)- 3659.20 MSL	DEPTH TO WATER (ft)- 43.42
TOC ELEVATION (ft)- 3661.22 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- G. Pierson	SCREEN MATERIAL- same 0.020" slots

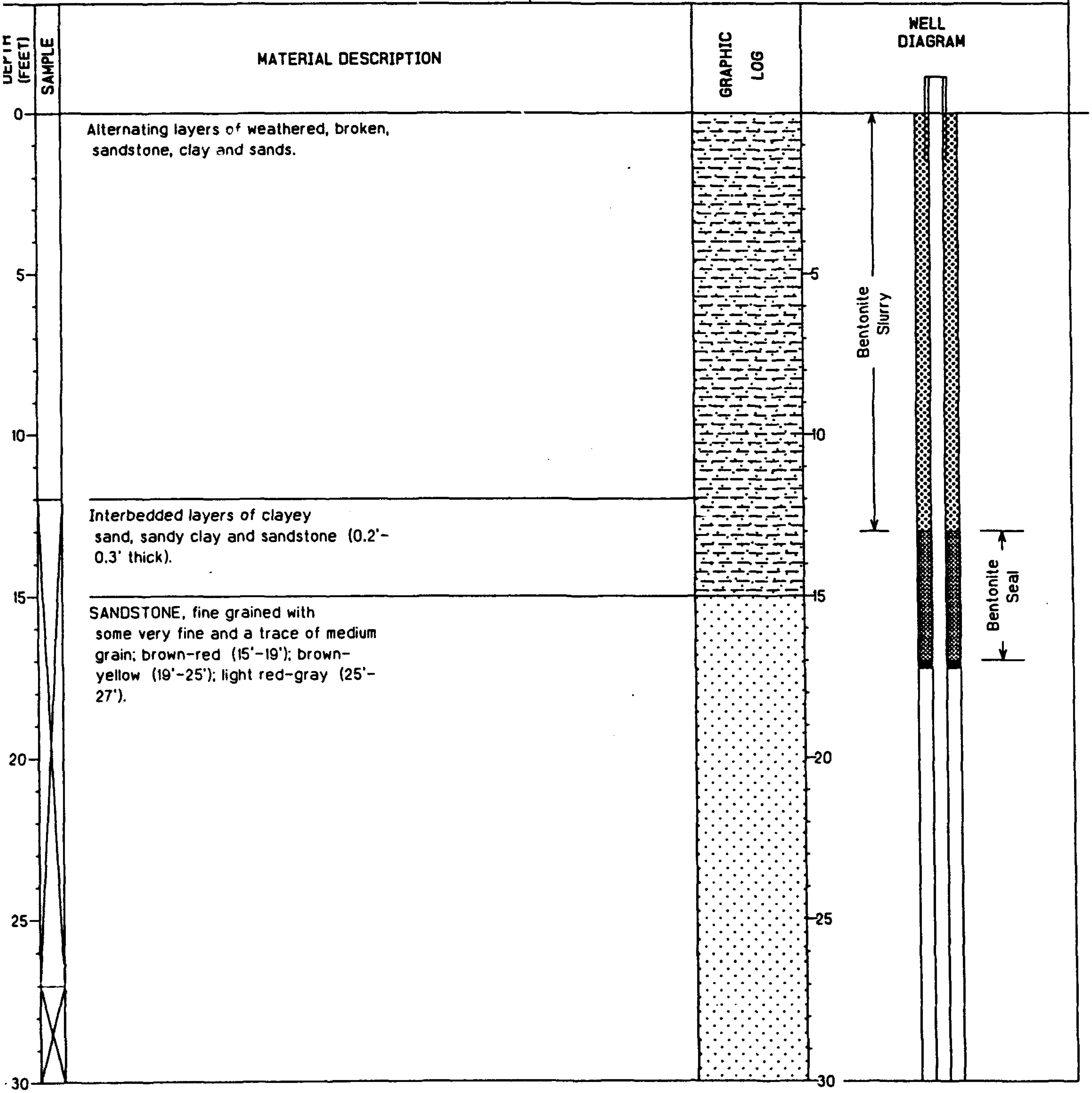
DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION	GRAPHIC LOG	WELL DIAGRAM
35				
40				
45		Same as above.		
50		SANDSTONE, gray, medium grained, very hard, well indurated, crystalline.		
		Same SANDSTONE as above, beginnning to grade into dark gray shaly sandstone.		
55		SANDSTONE, dark gray, mottled, shaly, slumping layers of gray, 'an sandstone with sugary texture.		
60				
		Total depth = 61'		
65				
70				



PIEZOMETER COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-(4-8)-P5
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 10/5/90
SITE- 4-8	WELL DEPTH (ft)- 57 BGL
GROUND ELEVATION (ft-MSL)- 3670.00 MSL	DEPTH TO WATER (ft)- 50.72
TOC ELEVATION (ft)- 3672.14 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- G. Pierson	SCREEN MATERIAL- same 0.020" slots

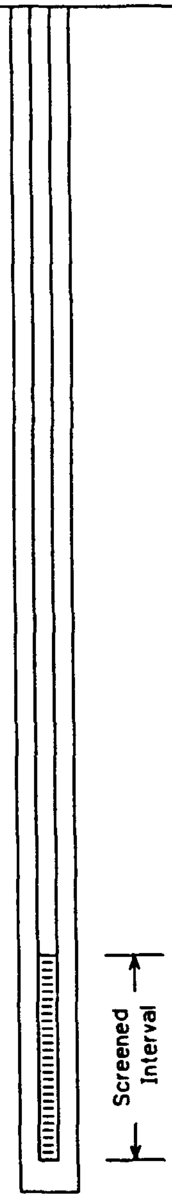
DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION	GRAPHIC LOG	WELL DIAGRAM
0		Alternating layers of weathered, broken, sandstone, clay and sands.		Bentonite Slurry (0–13)
12		Interbedded layers of clayey sand, sandy clay and sandstone (0.2'-0.3' thick).		Bentonite Seal (13–17)
15		SANDSTONE, fine grained with some very fine and a trace of medium grain; brown-red (15'-19'); brown-yellow (19'-25'); light red-gray (25'-27').		



PIEZOMETER COMPLETION DATA

.IENT- HAZWRAP	WELL I.D.- MANG- (4-8)-P5
ROJECT I.D.- Great Falls SI	DATE INSTALLED- 10/5/90
ITE- 4-8	WELL DEPTH (ft)- 57 BGL
ROUND ELEVATION (ft-MSL)- 3670.00 MSL	DEPTH TO WATER (ft)- 50.72
OC ELEVATION (ft)- 3672.14 MSL	DATE MEASURED- 10/28/90
OREHOLE DIAMETER (in)- 8	CASING MATERIAL- 2" sch 40 PVC
EOLOGIST- G. Pierson	SCREEN MATERIAL- same 0.020" slots

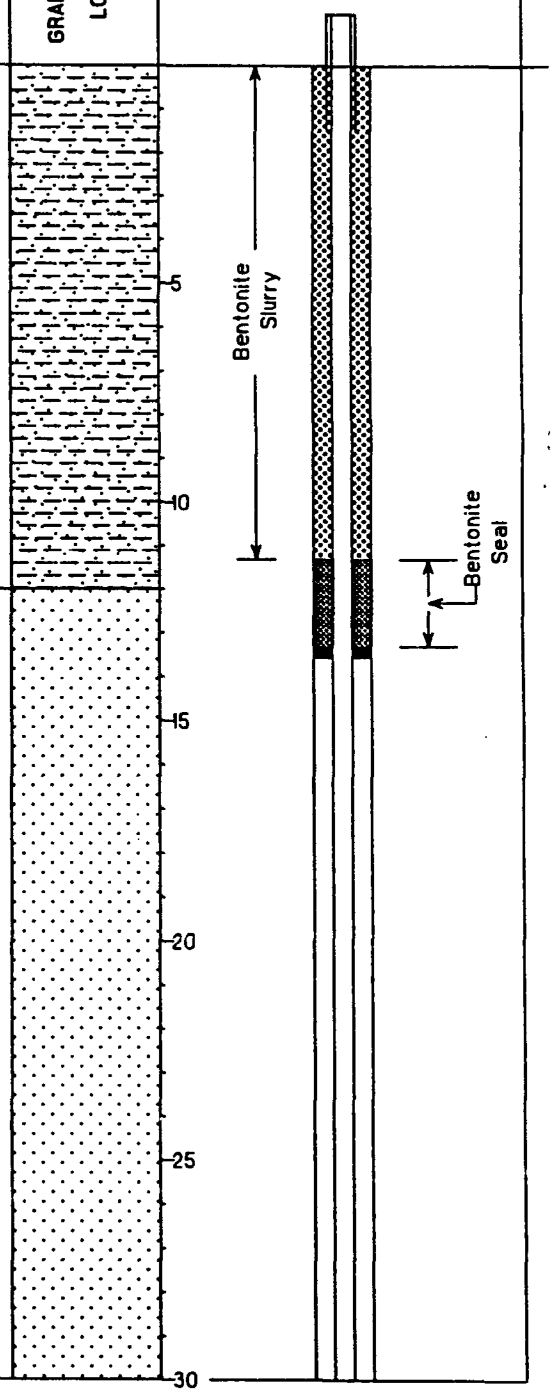
(FEET)	SAMPLE	MATERIAL DESCRIPTION	GRAPHIC LOG	WELL DIAGRAM
0				
		SANDSTONE, red-light brown with some gray, fine grained with traces of very fine and medium grains, circular iron stains, small vugs (< 0.01') some filled with soft black material.		
5			35	
0			40	
		SANDSTONE, same as above with a hard, gray, crystalline, medium to coarse grain, sandstone lens from 47'-48' and interbedded layers (0.2'thick) from 50'-51'.		
5			45	
0			50	
		SANDSTONE, dark gary mottled with light gray sandstone, shaly, with small (< 0.1') shale layers interbedded from 56' - 57'.		
5			55	
		Total Depth = 57'		
0			60	



PIEZOMETER COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-(4-8)-P6
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 10/6/90
SITE- 4-8	WELL DEPTH (ft)- 57.3 BGL
GROUND ELEVATION (ft-MSL)- 3680.85 MSL	DEPTH TO WATER (ft)- 43.5
TOC ELEVATION (ft)- 3683.03 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- V. Burkhardt	SCREEN MATERIAL- same 0.020" slots

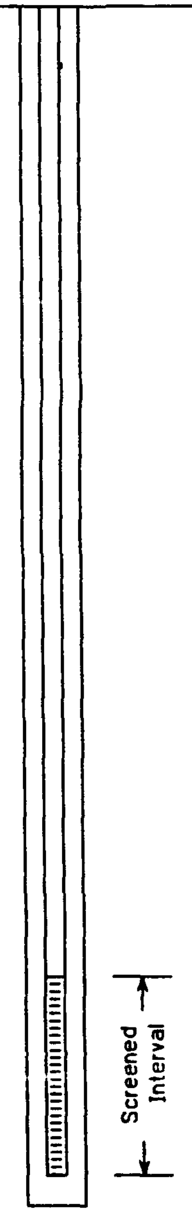
DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION	GRAPHIC LOG	WELL DIAGRAM
0		Alternating layers of weathered, broken, sandstone, clay and sands.		Bentonite Slurry
12	X	SANDSTONE, light brown, fine grained, iron staining, indurated, some fracturing.		Bentonite Seal
		SANDSTONE, same as above but yellow-gray-brown and fossil wood fragments at 25'.		
27	X	Same as above with 2 mm thick calcite seam at 29.7', wavy laminate of black, very fine grains throughout.		
30				



PIEZOMETER COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-(4-8)-P6
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 10/6/90
SITE- 4-8	WELL DEPTH (ft)- 57.3 BGL
GROUND ELEVATION (ft-MSL)- 3680.85 MSL	DEPTH TO WATER (ft)- 43.5
TOC ELEVATION (ft)- 3683.03 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- V. Burkhardt	SCREEN MATERIAL- same 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION	GRAPHIC LOG	WELL DIAGRAM
30–37		SANDSTONE, same as above with subtle reddish color.		
37–42		SANDSTONE, yellowish gray-brown, fine grained, light gray clayey sand layer at 40.1', 3 mm thick, wavy, black laminae.		
42–50.3		SANDSTONE, same as above with thin, quartz rich, medium coarse grained, 0.1' layer at 46.9'; gradational contact from 49.5' to 50.3'.		
50.3–57.3		SANDSTONE, dark gray, muddy, fine grained sandstone with quartz rich, light gray pockets throughout (elliptical and sub-elliptical), shaly.		
57.3		*Total Depth = 57.3'*		



D.2 Soil Borings

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-1-SB1
Project I.D.- Great Falls S. I.	Date Drilled- 9-18-90
Site- 1	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-4
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0			Soil, Sandy, brown, thin powdery caliche layers.		Soil Kept for Analysis 1.25' - 1.75' (A6-A7)
		1.5			
		3	Soil grades to to soft, weathered SANDSTONE, red-brown.		Soil Kept for Analysis 2.5' - 3.25' (B3-B5)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-1-SB2
Project I.D.- Great Falls S. I.	Date Drilled- 9-18-90
Site- 1	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-4.5
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0					
	■	1	SOIL, clayey, sandy with caliche powder, brown.		Soil Kept 0.5' - 1.5' (A3-A6)
	■	3	same as above with brown soft sandstone at 3.75' - 4.0'.		Soil Kept 3.0' - 3.75' (B5-B7)
5			Soft tan and gray SANDSTONE, some hard pieces of sandstone.		
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-1-SB3
Project I.D.- Great Falls S.I.	Date Drilled- 9-18-90
Site- 1	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-4
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

(FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		1	Soil, SANDY, brown with caliche powder at 1.0 feet.		Soil Kept 0.75' - 1.50' (A4-A6)
		3	Soil, SANDY, brown with caliche, SAND at 2.5 to 4 feet.		Soil Kept 2.5' - 3.25' (B3,4,5)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-1-SB4
Project I.D.- Great Falls S. I.	Date Drilled- 9-19-90
Site- 1	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-2
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		1.375	Soil, clayey, damp, brown, SAND is in bottom sleeve.		Soil Kept 1.0' - 1.75' (A5-7)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-1-SB5
Project I.D.- Great Falls S. I.	Date Drilled- 9-18-90
Site- 1	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-4
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		0.625	Soil, silty brown with caliche.		Soil Kept 0.25' - 1.0' (A2-A4)
		3.375	Soil grades to SAND at 3.25 feet. Sand is loose, blocky, tan.		Soil Kept 3.0' - 3.75' (B5,6,7)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-1-SB6
Project I.D.- Great Falls S. I.	Date Drilled- 9-19-90
Site- 1	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-3
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0			SOIL, brown, sandy.		
	X	1.125			Soil Kept 0.75' - 1.5' (A4,5,6)
	X				Soil Kept 2.25' - 3.0' (A6,7,8)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-1-SB7
Project I.D.- Great Falls S. I.	Date Drilled- 9-19-90
Site- 1	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-2
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		1	Black stained soil to 1.25 feet, unstained below.		Soil Kept 0.75' - 1.50' (A4,5,6)
5				5	
10				10	
15				15	

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-1-SB8
Project I.D.- Great Falls S. I.	Date Drilled- 9-19-90
Site- 1	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-2
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0			Brown, sandy soil.		
		1			Soil Kept 0.5' - 1.25' (A3,4,5)
5				5	
10				10	
15				15	

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-1-SB9
Project I.D.- Great Falls S. I.	Date Drilled- 9-19-90
Site- 1	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-3
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0			Soil, brown, SANDSTONE, blocky at bottom.		
		1			Soil Kept 1.0' - 1.75' (A5,6,7)
			Soil, SAND, SILT, SANDSTONE chuncks.		
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-2-SB1
Project I.D.- Great Falls S. I.	Date Drilled- 9-19-90
Site- 2	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-3
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0					
		1.25	Soil, brown to 1.25 feet, loose sand to 2.0 feet.		Soil Kept 0.75' - 1.75' (A4,5,6,7)
		2.625	Soil, soft SANDSTONE.		Soil Kept 2.25' - 3.0' (B5,6,7)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-2-SB2
Project I.D.- Great Falls S. I.	Date Drilled- 9-19-90
Site- 2	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-4
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0					
	0.75–1.75	1.25	SOIL, brown caliche powder		Soil Kept 0.75' - 1.75' (A4,5,6,7)
	3.0–3.75	3.375	SOIL, brown caliche powder to 2.75', sandy to 3.0', soft sandstone from 3.25' - 4.0'		Soil Kept 3.0' - 3.75' (B5,6,7)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-2-SB3
Project I.D.- Great Falls S. I.	Date Drilled- 9-19-90
Site- 2	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-2
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0					
		1	Dark brown SOIL to 0.5' then soft silty sandstone		Soil Kept 0.50' - 1.50' (A3,4,5,6)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-2-SB4
Project I.D.- Great Falls S. I.	Date Drilled- 9-20-90
Site- 2	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-2
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		1	Dark brown stained SOIL to 0.5' then soft silty sandstone, some dark blue stains at 1.75'		Soil Kept 0.25' - 0.75' (A2,3) 1.25' - 1.75' (A6,7)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-2-SB5
Project I.D.- Great Falls S. I.	Date Drilled- 9-20-90
Site- 2	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-2
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		1	Dark brown stained SOIL to 0.5' then soft silty sandstone		Soil Kept 0.50' - 1.0' (A3,4) 1.25' - 1.75' (A6,7)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-2-SB6
Project I.D.- Great Falls S. I.	Date Drilled- 9-20-90
Site- 2	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-2
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		1	Dark brown stained SOIL to 0.5' then soft silty sandstone		Soil Kept 0.50' - 1.0' (A3,4) 1.25' - 1.75' (A6,7)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-3-SB1A
Project I.D.- Great Falls S. I.	Date Drilled- 9-28-90
Site- 3	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-2
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0–2	1.0–1.75	1.375	SOIL, rocky, clayey, brown with sandstone blocks		Soil Kept 1.0' - 1.75' (A5,6,7)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-3-SB2A
Project I.D.- Great Falls S. I.	Date Drilled- 9-28-90
Site- 3	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-4
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0					
	X	1.375	SOIL to 0.5', broken sandstone, gravel, clayey sand to 2.0'.		Soil Kept 1.0' - 1.75' (A5,6,7)
	X	3.375	SOIL, gravelly sand grades to weathered sandstone with hard blocks.		Soil Kept 3.0' - 3.75' (B5,6,7)
5				5	
10				10	
15				15	

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-3-SB3A
Project I.D.- Great Falls S. I.	Date Drilled- 9-28-90
Site- 3	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-1.5
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		0.75	SOIL, rocky, clayey, brown with sandstone blocks		Soil Kept 1.0' - 1.25' (A5,6,7)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-3-SB4
Project I.D.- Great Falls S. I.	Date Drilled- 9-28-90
Site- 3	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-1.25
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		1	ASPHALT debris at top, clayey sand to sandstone at bottom		No Soil Kept
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-3-SB5A
Project I.D.- Great Falls S. I.	Date Drilled- 9-28-90
Site- 3	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-2
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0					
		1.375	SOIL, gray-brown, fine, sandy loam with rock fragments, moist.		Soil Kept 1.0' - 1.75' (A5,6,7)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-3-SB6
Project I.D.- Great Falls S. I.	Date Drilled- 9-28-90
S..e- 3	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-2.5
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		1	SOIL, discolored clay with odor to 1.75', no discolor from 1.75' to 2.0', clay with some caliche, damp.		Soil Kept 0.75' - 1.50' (A4,5,6)
		2.25	CLAY with some caliche, damp.		Soil Kept 2.25' - 2.50' (B7)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-3-SB7
Project I.D.- Great Falls S. I.	Date Drilled- 9-28-90
Site- 3	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-1.5
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0					
		0.875	SOIL, brown to dark brown clay with very weathred sandstone.		Soil Kept 0.50' - 1.25' (A5,6,7)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-3-SB8
Project I.D.- Great Falls S. I.	Date Drilled- 9-28-90
Site- 3	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-1.0
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0					
	■	0.5	SOIL, brown to dark brown clay/caliche 2" layer then hard fractured sandstone, tan, fine.		Soil Kept 0.25' - 1.0' (A6,7,8)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-3-SB9
Project I.D.- Great Falls S. I.	Date Drilled- 9-28-90
Site- 3	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-1.5
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		0.75	SOIL, clay/caliche to 1.25', broken sandstone from 1.25' to 1.5'.		Soil Kept 0.50' - 1.25' (A5,6,7)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-3-SB10
Project I.D.- Great Falls S. I.	Date Drilled- 9-28-90
Site- 3	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-3.5
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0					
		1.375	SOIL, brown silty		Soil Kept 1.0' - 1.75' (A5,6,7)
			SOIL, brown silty to 3.25' then hard weathered sandstone, beige.		Soil Kept 2.5' - 3.25' (B5,6,7)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-4-SB1
Project I.D.- Great Falls S. I.	Date Drilled- 9-20-90
Site- 4	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-5.5
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	HNu/OVA (ppm)	MATERIAL DESCRIPTION	REMARKS
0	0.75 1.5	SOIL, sandy clayey. loose sand below.	Soil Kept 0.50' - 1.0' (A3,4) 1.25' - 1.75' (A6,7)
	2.75 3.5	SOIL, loose sand to 2.5', soft very fine sandstone with silt to 4.0'.	Soil Kept 2.5' - 3.0' (B3,4) 3.25' - 3.75' (B6,7)
5	4.75	SOIL, soft, very fine sandstone, moist, silty, brown to tan.	Soil Kept 4.25' - 5.25' (C4,5,6,7)
10			
15			

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-4-SB2
Project I.D.- Great Falls S. I.	Date Drilled- 9-20-90
Site- 4	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-4
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		1.1	SOIL, brown sandy to 1.0', then soft tan sandstone.		Soil Kept 0.50' - 1.0' (A3,4) 1.25' - 1.75' (A6,7)
		3.0	SOIL, gray, soft sandstone, very fine. minor blue staining (diesel odors in bottom sleeve)		Soil Kept 2.25' - 2.75' (B2,3) 3.25' - 3.75' (B6,7)
5				5	
10				10	
15				15	

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-4-SB3
Project I.D.- Great Falls S. I.	Date Drilled- 9-20-90
Site- 4	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-8
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		1	SOIL, very sandy with caliche blocks		Soil Kept 0.50' - 1.0' (A3,4) 1.25' - 1.75' (A6,7)
		3.0	SOIL, silty sand, tan caliche near bottom.		Soil Kept 2.75' - 3.25' (B3-5)
5		4.75	SOIL, brown, soft fine sandstone.		Soil Kept 4.25' - 5.0' (C2,3,4)
		6.875			Soil Kept 6.5' - 7.25' (D3,4,5)
10					
15					

SOIL BORING LOG

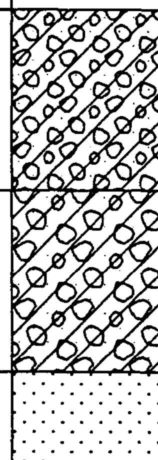
Client- HAZWRAP	Boring I.D.- MANG-4-SB4
Project I.D.- Great Falls S. I.	Date Drilled- 9-20-90
Site- 4	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-7.7
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0			SOIL, sandy with gravel to 1.25', then clayey with gravel.		
		1.375	SOIL, black clayey, odorous.		Soil Kept 1.0' - 1.75' (A5,6,7)
		3.375			Soil Kept 3.0' - 3.75' (B5,6,7)
5		5.375	SOIL, very soft sandstone, very fine, tan, silty, odorous cuttings, no odor in core, damp.	5	Soil Kept 5.0' - 5.75' (C5,6,7)
		7.125	SOIL, soft sandstone to 6.5', turning harder.		Soil Kept 6.75' - 7.50' (D4,5,6)
10				10	
15				15	

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-4-SB5
Project I.D.- Great Falls S. I.	Date Drilled- 9-20-90
Site- 4	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-5
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		1.375	SOIL, sandy clayey soil with gravel.		Soil Kept 1.0' - 1.75' (A5,6,7)
		3.375	SOIL, sandy clayey soil with gravel, soft sandstone with gravel.		Soil Kept 3.0' - 3.75' (B5,6,7)
5		4.625	SOIL, soft sandstone.		Soil Kept 4.25 - 5.0' (C6,7,8)
10					
15					



SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-5-SB1
Project I.D.- Great Falls S. I.	Date Drilled- 9-29-90
Site- 5	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-8
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		1	SOIL, light brown silty soil, some caliche, some gravel.		Soil Kept 0.75' - 1.25' (A4,5,6)
		3.375	SOIL, light brown silty soil, some caliche, some gravel, to 3.0', then brown sandy soil and silty sand.		Soil Kept 3.0' - 3.75' (B5,6,7)
5		4.875	SOIL, light brown clayey silt with caliche to 5.0', then fine brown sand with chunks of sandstone to 6.0'.		Soil Kept 4.75' - 5.0' (C2,3,4)
		7.375	SOIL, silty sand with some harder blocks.		Soil Kept 7.0' - 7.75' (D5,6,7)
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-5-SB2
Project I.D.- Great Falls S. I.	Date Drilled- 9-29-90
Site- 5	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-4
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		1	SOIL, grayish, clayey.		Soil Kept 0.75' - 1.50' (A4,5,6)
		3	SOIL, silty soil to 3.0' then loose sand, tan, fine.		Soil Kept 2.75' - 3.50' (B4,5,6)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-5-SB3
Project I.D.- Great Falls S. I.	Date Drilled- 9-29-90
Site- 5	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-6.5
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		0.5	CONCRETE.		
	■	1.5	SOIL, fill rubble, gravel to 1.50' then silty dark brown soil to 2.0'.		Soil Kept 1.0' - 1.75' (A5,6,7)
	■	3	SOIL, silty dark brown to 3.50', then gray silty clay to 4.0'.		Soil Kept 3.0' - 3.75' (B5,6,7)
5	■	5	SOIL, dark brown silty sand to 4.75', then gray silty clay to 5.25, grades to tan sand with soft brown sandstone.		Soil Kept 4.5' - 5.25' (C3,4,5)
	■	6.25	SOIL, soft brown sandstone.		Soil Kept 6.0' - 6.50' (D7,8)
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-5-SB4
Project I.D.- Great Falls S. I.	Date Drilled- 9-29-90
Site- 5	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-6
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		1.75	SOIL, fill, gravel, sand to 1.25', then dark brown silty sand.		Soil Kept 1.25' - 2.0' (A6,7,8)
		3.375	SOIL, gray clay, damp, plastic.		Soil Kept 3.0' - 3.75' (B5,6,7)
5		5.375	SOIL, clay ata top, then loose brown tan sand, fine to medium pea gravel, silty sandstone at bottom.		Soil Kept 5.0' - 5.75' (C5,6,7)
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-6-SB1
Project I.D.- Great Falls S. I.	Date Drilled- 9-24-90
Site- 6	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-6
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0			SOIL, sandy clayey gravel, to 1.50', then brown sandy gravel.		
	■	1.375			Soil Kept 1.0' - 1.75' (A5,6,7)
			SOIL, brown sandy gravel.		
	■	3.375			Soil Kept 3.0' - 3.75' (B5,6,7)
			SOIL, muddy wet sand		
5		5		5	
10				10	
15				15	

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-6-SB2
Project I.D.- Great Falls S. I.	Date Drilled- 9-24-90
Site- 6	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-8
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0			SOIL, clayey, sandy, gravel to 1.0', sandy gravel to 2.0'.		
		1.375			Soil Kept 1.0' - 1.75' (A5,6,7)
			SOIL, very sandy gravel, hard sandstone layer at 3.75'.		
		3.125			Soil Kept 2.75' - 3.50' (B4,5,6)
			SOIL, black stained sand, very wet, slight diesel odor.		
5		5.125			Soil Kept 5.0' - 5.25' (C4,5)
			SOIL, black stained, loose fine sand and gravel, wet, clayey sand at bottom.		
		7.125			Soil Kept 6.75' - 7.50' (D4,5,6)
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-6-SB3
Project I.D.- Great Falls S. I.	Date Drilled- 9-24-90
Site- 6	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-6
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		1.125	SOIL, sand and gravel to 1.50', clayey sand to 2.0', odorous.		Soil Kept 0.75' - 1.50' (A4,5,6)
		3.125	SOIL, Black stained sand and soft sandstone.		Soil Kept 2.75' - 3.5' (B4,5,6,7)
5		5.375	SOIL, black stained and tan soft sandstone, wet, saturated, very odorous, oily.		Soil Kept 5.0' - 5.75' (C5,6,7)
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-6-SB4
Project I.D.- Great Falls S. I.	Date Drilled- 9-25-90
Site- 6	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-5.5
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		1.125	SOIL, gravelly sand.		Soil Kept 0.75' - 1.50' (A4,5,6)
		3.375	SOIL, gravelly sand and sandstone blocks.		Soil Kept 3.0' - 3.75' (B5,6,7)
5		4.875	SOIL, soft sandstone with blocks.		Soil Kept 4.25' - 5.50' (C6,7,8)
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-6-SB5
Project I.D.- Great Falls S. I.	Date Drilled- 9-25-90
Site- 6	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-3.0
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0					
		1.125	SOIL, gravelly sand to 1.0', then gravelly clay to 2.0'.		Soil Kept 0.75' - 1.50' (A4,5,6)
		2.375	SOIL, sandstone with hard blocks.		Soil Kept 2.0' - 2.75' (B5,6,7)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-6-SB5
Project I.D.- Great Falls S. I.	Date Drilled- 9-25-90
Site- 6	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-3.0
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0					
		1.125	SOIL, gravelly sand to 1.0', then gravelly clay to 2.0'.		Soil Kept 0.75' - 1.50' (A4,5,6)
		2.375	SOIL, sandstone with hard blocks.		Soil Kept 2.0' - 2.75' (B5,6,7)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-6-SB6
Project I.D.- Great Falls S. I.	Date Drilled- 9-25-90
Site- 6	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-3.5
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		0.875	SOIL, sandy gravel to 1.0', then clayey sand to 2.0'.		Soil Kept 0.50' - 1.25' (A2,3,4)
		3.25	SOIL, gravelly, clayey sand to 3.25', then soft sandstone to 3.50'.		Soil Kept 3.0' - 3.50' (B5,6,7)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-6-SB7
Project I.D.- Great Falls S. I.	Date Drilled- 9-25-90
Site- 6	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-3.5
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		0.625	SOIL, brown sandy fill with gravel to 0.5'; 0.5'-1.7' gray sandy fill with clay; 1.7'-2.0' light brown sand, fine with some clay.		Soil Kept 0.25' - 1.0' (A2,3,4)
		3.25	SOIL, light brown fine sand with some clay.		Soil Kept 3.0' - 3.50' (B5,6)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-6-SB8
Project I.D.- Great Falls S. I.	Date Drilled- 10-10-90
Site- 6	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-4
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0					
	■	1.375	SOIL, brown sandy fill with some gravel to 0.8'; 0.8'-2' gray sandy fill with gravel.		Soil Kept 1.0' - 1.75' (A5,6,7)
		3	SOIL, soft wreathered sandstone.		
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-6-SB9
Project I.D.- Great Falls S. I.	Date Drilled- 10-10-90
Site- 6	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-3
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		0.625	SOIL, brown sand and gravel to 0.8'; 0.8'-1.2' dark gray clay fill with gravel.		Soil Kept 0.25' - 1.0' (A2,3,4)
		2.5	SOIL, brown and gray sandy fill to 2.2'; 2.2'-3' weathered brown sandstone.		
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-6-SB10
Project I.D.- Great Falls S. I.	Date Drilled- 10-10-90
Site- 6	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-3
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0			SOIL, *brown sandy fill with gravel* aggregate to 0.5'; 0.5'-1.5' dark gray sandy clayey fill with gravel; 1.5'-2.0' weathered light brown sandstone.		
	■	1.375			Soil Kept 1.0'- 1.75' (A5,6,7)
	■	2.5	SOIL, weatherd light brown sandstone.		Soil Kept 2.5' - 3.0' (B7,8)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-6-SB11
Project I.D.- Great Falls S. I.	Date Drilled- 10-10-90
Site- 6	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-2
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		1.125	SOIL, brown sandy fill with gravel aggregate to 0.5'; 0.5'-1.5', dark gray sandy clayey fill with gravel; 1.5'-2' weathered light brown sandstone.		Soil Kept 0.75' - 1.50' (A4,5,6)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-6-SB12
Project I.D.- Great Falls S. I.	Date Drilled- 10-10-90
Site- 6	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-7
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		1.375	SOIL, brown sandy fill to 0.7'; 0.7'-1.5' gray sandy clayey fill; 1.5'-2' brown sandy fill, moist.		Soil Kept 1.0' - 1.75' (A5,6,7)
		3 3.375	SOIL, brown clayey sand with gravel, moist.		
5			SOIL, brown clayey sand, moist-wet.		Soil Kept 3.0' - 3.75' (B5,6,7)
		6.5	SOIL, brown weathered sandstone, wet.		
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-6-SB13
Project I.D.- Great Falls S. I.	Date Drilled- 10-11-90
Site- 6	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-3
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		1	SOIL, brown sandy fill with gravel to 0.5'; 0.5'-1.2' gray sandy clay fill with gravel; 1.2'-2.0' gray sandy clay fill, some gravel.		Soil Kept 0.25 - 1.25' (A2,3,4,5)
		2.5	SOIL, gray sandy clay fill, some gravel.		Soil Kept 3.0' - 4.0' (B5,6,7,8)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-6-SB14
Project I.D.- Great Falls S. I.	Date Drilled- 10-11-90
Site- 6	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-6.2
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		1.375	SOIL, brown sandy fill with some clay and gravel.		Soil Kept 1.0' - 1.75' (A5,6,7)
		3	SOIL, grayish-brown sandy fill with some clay.		
5		5.125	SOIL, weathered brown sandstone, moist.		Soil Kept 4.75' - 5.5' (C4,5,6)
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-7-SB1
Project I.D.- Great Falls S. I.	Date Drilled- 9-27-90
Site- 7	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-3
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0					
		1.625	SOIL, gravelly sand.		Soil Kept 1.25 - 2.0' (A6,7,8)
		2.375	SOIL, gravelly sand to hard sandstone at 3.0'.		Soil Kept 2.0' - 2.75' (B5,6,7)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-1-SB7
Project I.D.- Great Falls S. I.	Date Drilled- 9-19-90
Site- 1	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-2
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		1	Black stained soil to 1.25 feet, unstained below.		Soil Kept 0.75' - 1.50' (A4,5,6)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-7-SB3
Project I.D.- Great Falls S. I.	Date Drilled- 9-27-90
Site- 7	Borehole Diameter (in.)- 8
Ground Elevation-	Boring Depth (ft.)-7
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		1.375	SOIL, dark brown, stained fine sand to 1.0' then clayey sand, very odorous.		Soil Kept 1.0' - 1.75' (A5,6,7)
		3.375	SOIL, fine sand at top, stained dark brown clayey gravelly sand at bottom.		Soil Kept 3.0' - 3.75' (B5,6,7)
5		5.625	SOIL, gray clayey sand, very odorous.		Soil Kept 5.25' - 6.0' (C6,7,8)
		6.375	SOIL, black stained soft sandstone, odorous.		Soil Kept 6.0' - 6.75' (D5,6,7)
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-7-SB4
Project I.D.- Great Falls S. I.	Date Drilled- 9-28-90
Site- 7	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-4.75
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0			SOIL, dark brown stained sand to 0.5'; gravelly brown clay to 2.0'.		
		1.375			Soil Kept 1.0' - 1.75' (A5,6,7)
			SOIL, sandy clay to 3.25'; soft tan sandstone to 4.0'.		
		3.125			Soil Kept 2.75' - 3.50' (B4,5,6)
		4.375	SOIL, soft tan sandstone.		Soil Kept 4.0' - 4.75' (C6,7,8)
5				5	
10				10	
15				15	

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-8-SB1
Project I.D.- Great Falls S. I.	Date Drilled- 9-26-90
Site- 8	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-3
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0			SOIL, gravelly sand to 1.25', then black stained soft silty sandstone.		
		1.375	SOIL, black stained soft silty sandstone with blocks.		Soil Kept 1.0' - 1.75' (A5,6,7)
		2.625			Soil Kept 2.25' - 3.0' (B6,7,8)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-8-SB2
Project I.D.- Great Falls S. I.	Date Drilled- 9-27-90
Site- 8	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-5.25
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		0.875	SOIL, brown silty sand, gravelly to 1.25'; becomes gray stained to 1.50'; asphaltic rock in bottom.		Soil Kept 0.5' - 1.25' (A3,4,5)
		3.125	SOIL, brown sand, gravelly, blocky, some gray staining at bottom.		Soil Kept 2.75' - 3.5' (B4,5,6)
5		4.625	SOIL, sand, gravelly to 4.75'; soft tan sandstone to 5.25'.		Soil Kept 4.25' - 5.0' (C5,6,7)
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-8-SB3
Project I.D.- Great Falls S. I.	Date Drilled- 9-27-90
Site- 8	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-5
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		1.125	SOIL, gravelly sand to 1.25', then soft gray sandstone with harder blocks to 2.0'.		Soil Kept 0.75' - 1.50' (A4,5,6)
		3.125	SOIL, gravelly sand and clay to 3.25' then sand and soft sandstone to 4.0'.		Soil Kept 2.75' - 3.5' (B4,5,6)
		4.375	SOIL, sand and soft sandstone.		Soil Kept 4.0' - 4.75' (C5,6,7)
5					
10					
15					

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-8-SB4
Project I.D.- Great Falls S. I.	Date Drilled- 9-27-90
Site- 8	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-5
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		1.125	SOIL, gravelly sand to 1.25'; gravelly dark brown, discolored sand to 2.0'.		Soil Kept 0.75' - 1.50' (A5,6,7)
		3.125	SOIL, clayey, gravelly sand to 3.0'; grades to soft tan sandstone, fine.		Soil Kept 2.75' - 3.5' (B4,5,6)
		4.375	SOIL, soft tan sandstone.		Soil Kept 4.0' - 4.75' (C5,6,7)
5				5	
10				10	
15				15	

SOIL BORING LOG

Client- HAZWRAP	Boring I.D.- MANG-8-SB5
Project I.D.- Great Falls S. I.	Date Drilled- 9-27-90
Site- 8	Borehole Diameter (in.)- 6
Ground Elevation-	Boring Depth (ft.)-5
Geologist- Rick Nelson	Drilling Method- Hollow Stem Auger
Drilling Firm- Boland Drilling	Sampling Method- Split Spoon

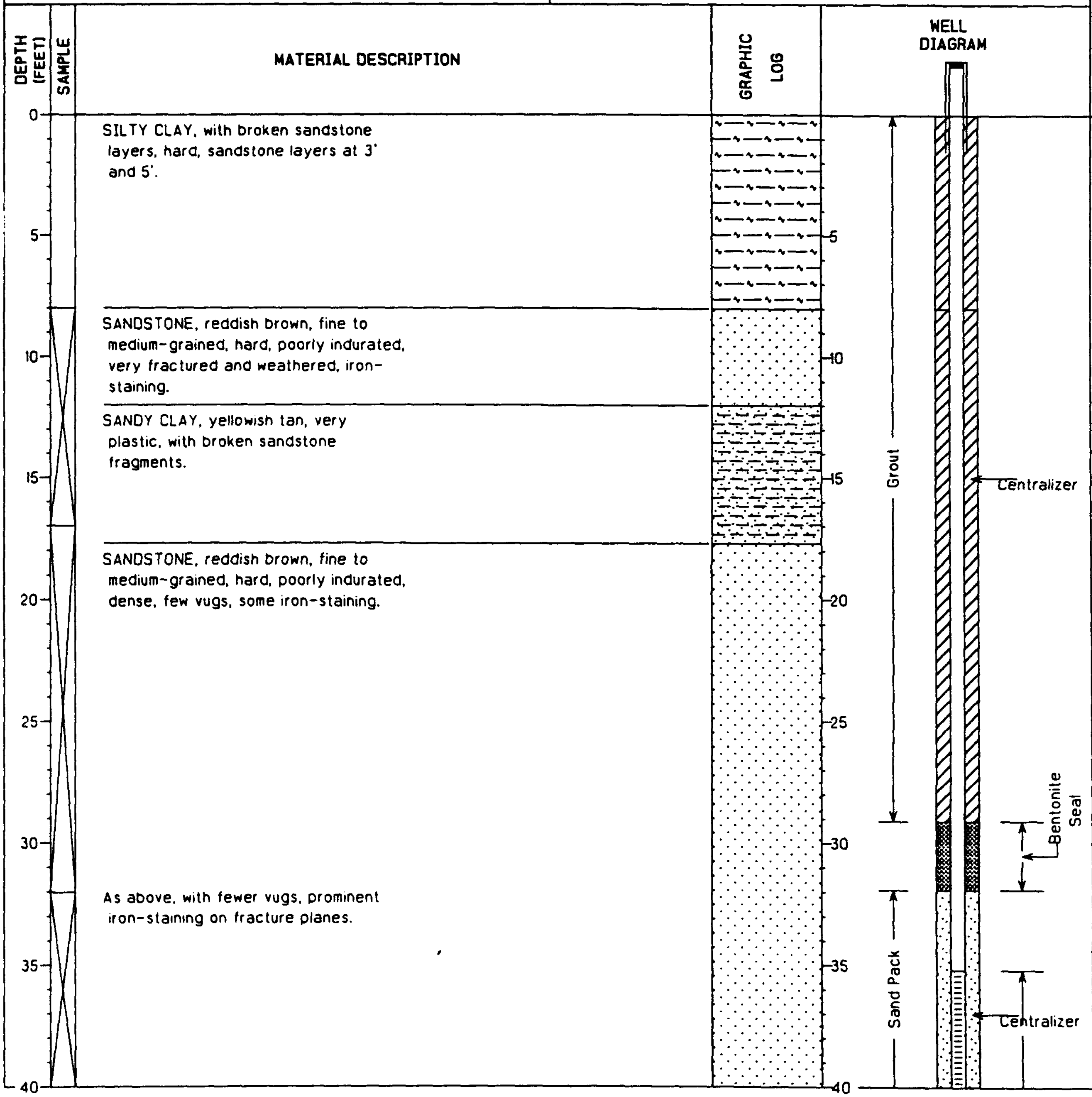
DEPTH (FEET)	SAMPLE	HNu/OVA (ppm)	MATERIAL DESCRIPTION	GRAPHIC LOG	REMARKS
0		1.375	SOIL, gravelly brown sand.		Soil Kept 1.0' - 1.75' (A4,5,6)
		3.125	SOIL, gravelly sand to 3.0'; soft tan sandstone to 4.0'.		Soil Kept 2.75' - 3.5' (B4,5,6)
5		4.625	SOIL, soft, tan, fine sandstone.		Soil Kept 4.25' - 5.0' (C5,6,7)
10					
15					

D.3 Monitoring Wells

MONITOR WELL COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-1-MW1
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 9/27/90
SITE- 1	WELL DEPTH (ft)- 55.4 BGL
GROUND ELEVATION (ft-MSL)- 3653.50	DEPTH TO WATER (ft)- 50.07
TOC ELEVATION (ft)- 3655.74 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- J. Bauer	SCREEN MATERIAL- 0.020" slots

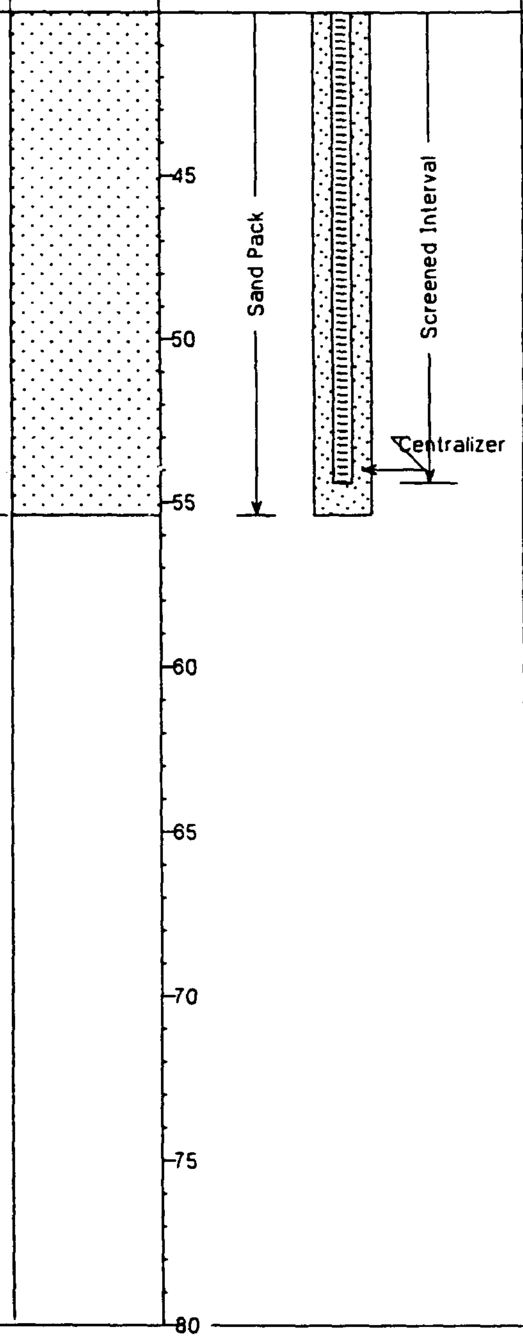
DEPTH (FEET)	MATERIAL DESCRIPTION
0	SILTY CLAY, with broken sandstone layers, hard, sandstone layers at 3' and 5'.
8	SANDSTONE, reddish brown, fine to medium-grained, hard, poorly indurated, very fractured and weathered, iron-staining.
12	SANDY CLAY, yellowish tan, very plastic, with broken sandstone fragments.
17.8	SANDSTONE, reddish brown, fine to medium-grained, hard, poorly indurated, dense, few vugs, some iron-staining.
32	As above, with fewer vugs, prominent iron-staining on fracture planes.



MONITOR WELL COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-1-MW1
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 9/27/90
SITE- 1	WELL DEPTH (ft)- 55.4 BGL
GROUND ELEVATION (ft-MSL)- 3653.50	DEPTH TO WATER (ft)- 50.07
TOC ELEVATION (ft)- 3655.74 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- J. Bauer	SCREEN MATERIAL- 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION	GRAPHIC LOG	WELL DIAGRAM
40–47	X	As above, with black to dark gray streaks.		
47–55	X	As above, with 0.2' well indurated, hard, medium to coarse-grained, with siliceous cement sandstone at 48' and 52' BGL.		
55.4		*Total Depth = 55.4' BGL.*		



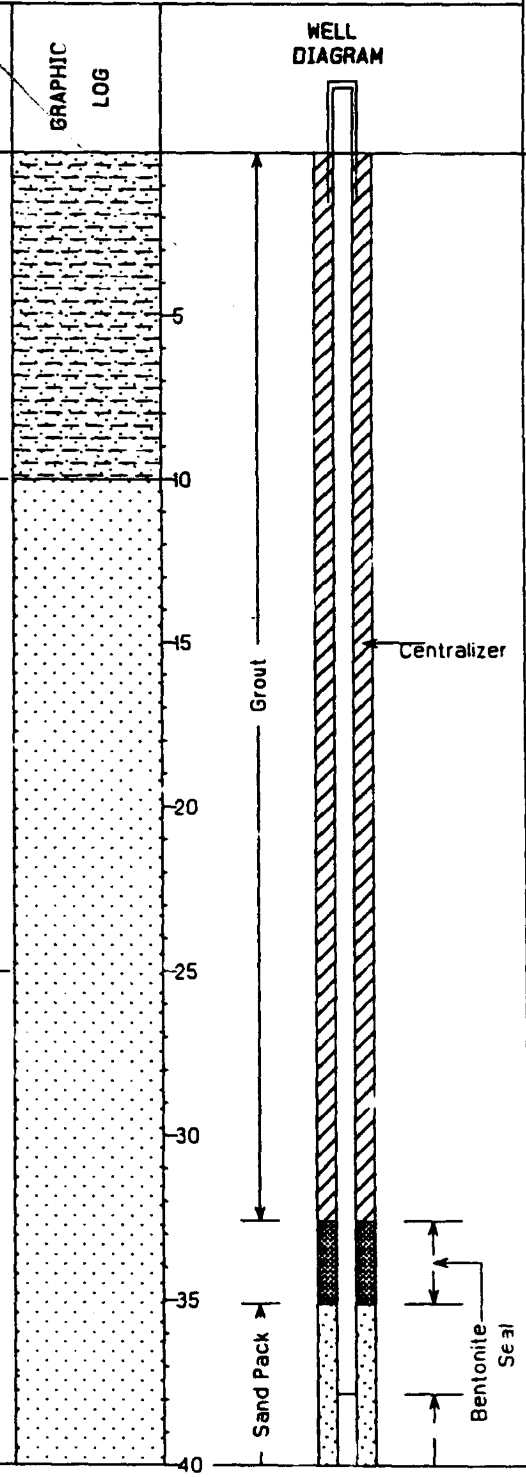
MONITOR WELL COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-2-MW1
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 10/1/90
SITE- 2	WELL DEPTH (ft)- 58.55 BGL
GROUND ELEVATION (ft-MSL)- 3659.80 MSL	DEPTH TO WATER (ft)- 42.32
TOC ELEVATION (ft)- 3661.99 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- B. Vanderglas	SCREEN MATERIAL- 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION
0		SAND and CLAY, with fractured sandstone.
10		SANDSTONE, light tan to reddish brown, upper 6' very fractured and weathered, fine to medium-grained, iron-staining, horizontal fractures throughout core.
25		SANDSTONE, light tan to light brown, fractured, scattered seams of medium to coarse-grained sandstone, very hard and well indurated, iron-staining from 25 - 33' BGL.
		SANDSTONE, very hard, well indurated, no fractures, light tan to light brown with light gray streaks.

GRAPHIC LOG

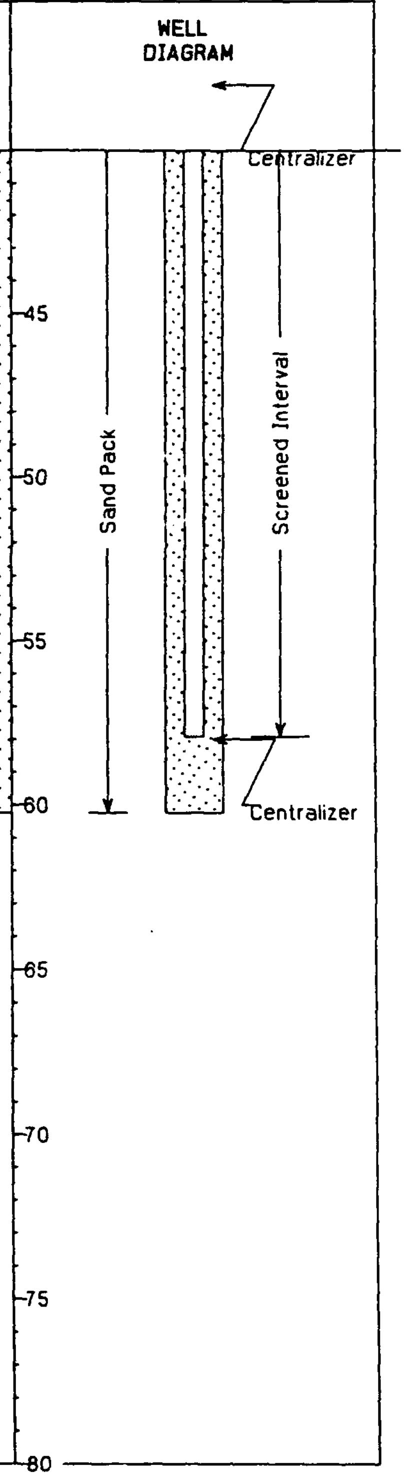
WELL DIAGRAM



MONITOR WELL COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-2-MW1
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 10/1/90
SITE- 2	WELL DEPTH (ft)- 58.55 BGL
GROUND ELEVATION (ft-MSL)- 3659.80 MSL	DEPTH TO WATER (ft)- 42.32
TOC ELEVATION (ft)- 3661.99 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- B. Vanderglas	SCREEN MATERIAL- 0.020" slots

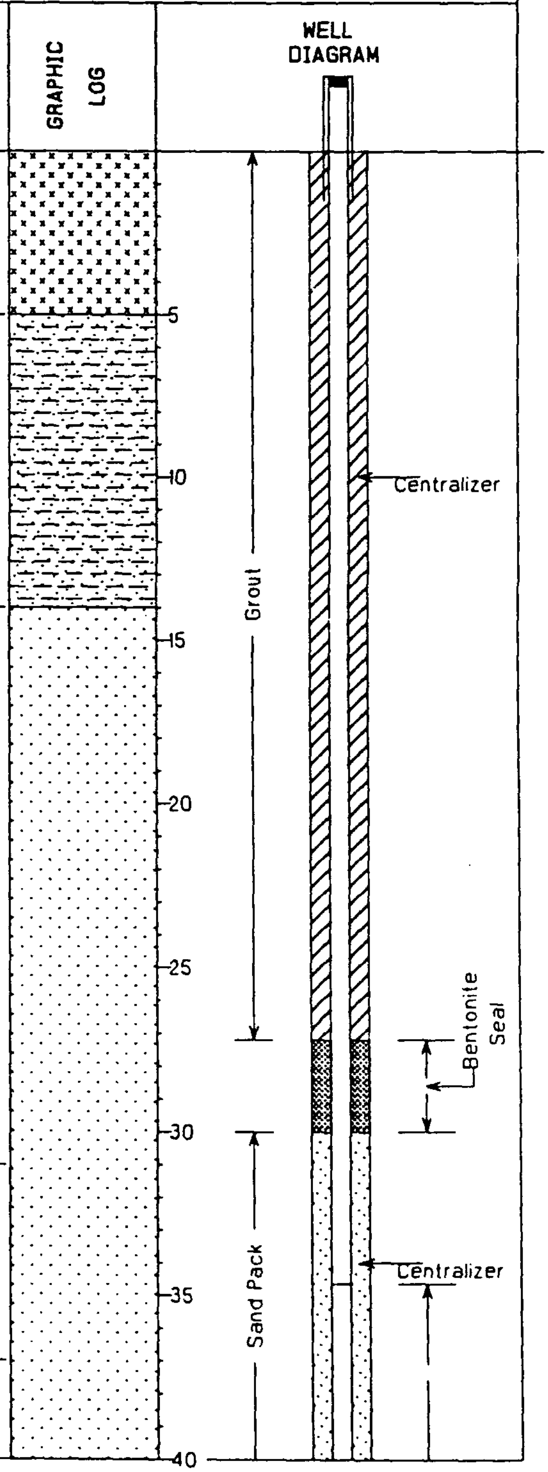
DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION	GRAPHIC LOG	WELL DIAGRAM
40–55		SANDSTONE, tan to gray, hard, competent, poorly indurated, iron-staining, small soft weathered layers, horizontal fractures, becoming dark gray and mottled at 55' BGL. From 52.5 - 55' becomes more indurated.		
55–60		SANDSTONE, grayish black, hard, indurated, few large fractures, with major break at 59' BGL.		
60		*Total Depth = 60.23' BGL*		



MONITOR WELL COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-3-MW1
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 10/3/90
SITE- 3	WELL DEPTH (ft)- 55.00 BGL
GROUND ELEVATION (ft-MSL)- 3636.00 MSL	DEPTH TO WATER (ft)- 43.17
TOC ELEVATION (ft)- 3638.33 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- B. Vandergias	SCREEN MATERIAL- same 0.020" slots

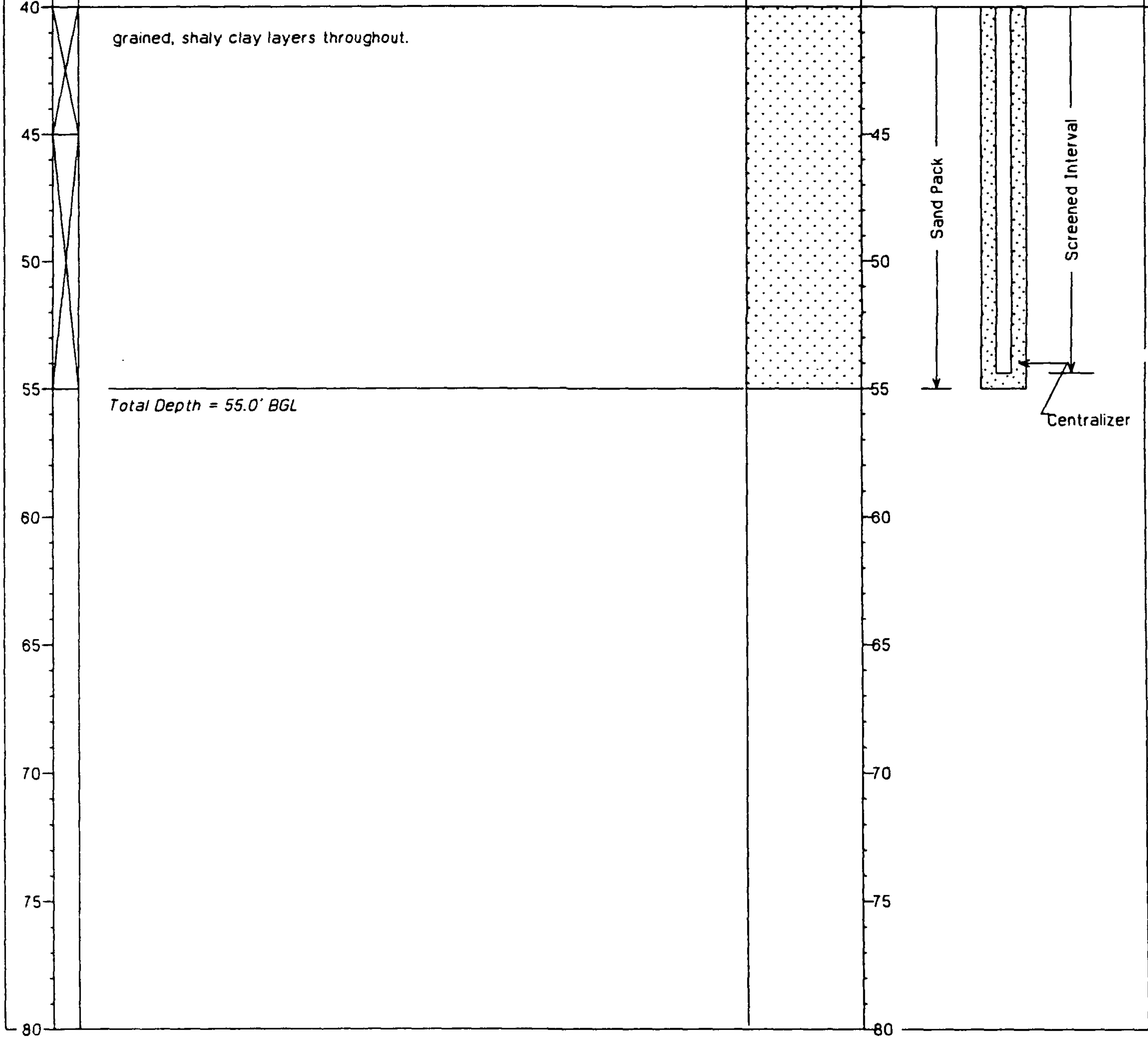
DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION
0		FILL.
5		SANDY CLAY, light brown with fragmented sandstone.
10		
15		SANDSTONE, reddish brown to gray, weathered, horizontal fractures, poorly indurated, hard and competent, iron-staining, some interbedded layers of soft, brittle, weathered sandstone, fine to medium-grained.
20		
25		As above, very hard, crystalline, well indurated sandstone, quartz rich. As above, from 25-30' vertical and horizontal fractures, very weathered, soft, brittle.
30		SANDSTONE, varigated coloring, with large iron stain streaks throughout and black deposits, heavily fractured with shaly clay deposits on fracture planes, indurated.
35		SANDSTONE, gray to grayish black with light reddish brown and tan iron stains throughout, indurated, hard, fine-
40		



MONITOR WELL COMPLETION DATA

CLIENT - HAZWRAP	WELL I.D.- MANG-3-MW1
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 10/3/90
SITE- 3	WELL DEPTH (ft)- 55.00 BGL
GROUND ELEVATION (ft-MSL)- 3636.00 MSL	DEPTH TO WATER (ft)- 43.17
TOC ELEVATION (ft)- 3638.33 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- B. Vanderglas	SCREEN MATERIAL- same 0.020" slots

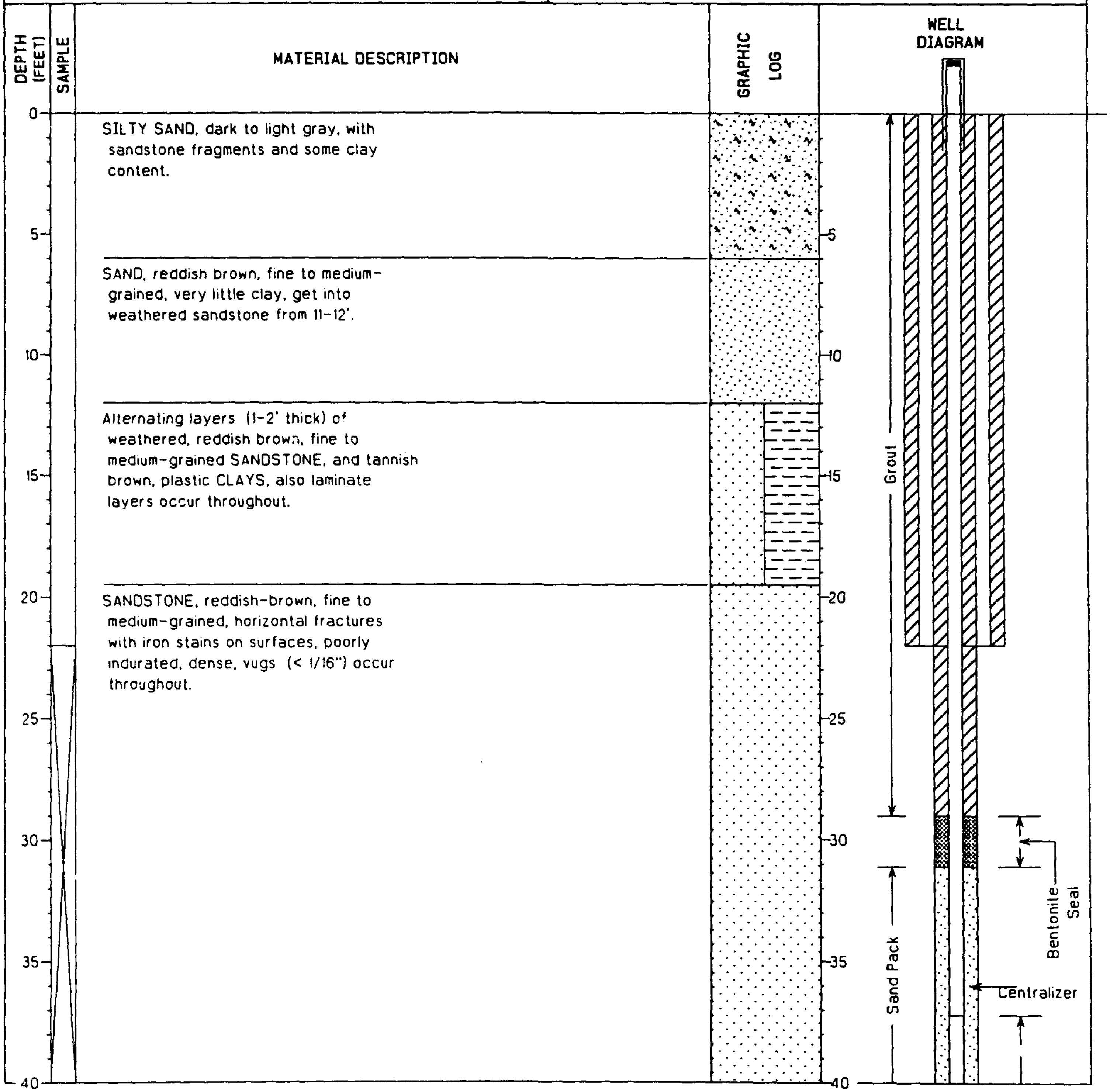
DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION	GRAPHIC LOG	WELL DIAGRAM
40		grained, shaly clay layers throughout.		
55		Total Depth = 55.0' BGL		



MONITOR WELL COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-4-MW1
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 10/15/90
SITE- 4	WELL DEPTH (ft)- 57.85 BGL
GROUND ELEVATION (ft-MSL)- 3663.20 MSL	DEPTH TO WATER (ft)- 47.78
TOC ELEVATION (ft)- 3665.61 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- G. Pierson	SCREEN MATERIAL- 0.020 slots

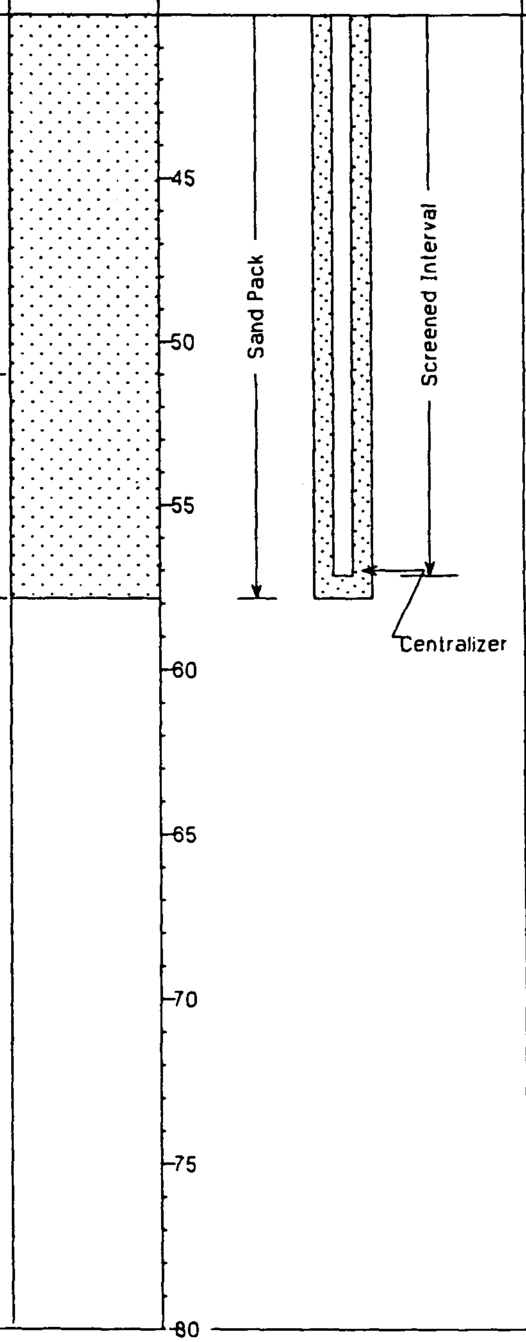
DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION
0		SILTY SAND, dark to light gray, with sandstone fragments and some clay content.
6		SAND, reddish brown, fine to medium-grained, very little clay, get into weathered sandstone from 11-12'.
12		Alternating layers (1-2' thick) of weathered, reddish brown, fine to medium-grained SANDSTONE, and tannish brown, plastic CLAYS, also laminate layers occur throughout.
20		SANDSTONE, reddish-brown, fine to medium-grained, horizontal fractures with iron stains on surfaces, poorly indurated, dense, vugs (< 1/16") occur throughout.



MONITOR WELL COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-4-MW1
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 10/15/90
SITE- 4	WELL DEPTH (ft)- 57.85 BGL
GROUND ELEVATION (ft-MSL)- 3663.20 MSL	DEPTH TO WATER (ft)- 47.78
TOC ELEVATION (ft)- 3665.61 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- G. Pierson	SCREEN MATERIAL- 0.020 slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION	GRAPHIC LOG	WELL DIAGRAM
40		As above, with a .3'-thick layer of gray, very hard, well indurated, crystalline, fine to medium-grained sandstone at 40.2-40.5' BGL, also circular iron-staining and larger, elongated vugs (1/8" wide) occur in this core. Had some small hits on the HNU (<2 ppm) along fractures up to 48' BGL.		
45				
50		SANSTONE, with a layer of the previously described hard, gray, crystalline sandstone at 52.5-53' BGL. *From 55-57' intermixed with the light gray sandstone and reddish brown sandstone, beginning to grade into dark, shaly sandstone.*		
55				
		Total Depth = 57' BGL		
60				
65				
70				
75				
80				

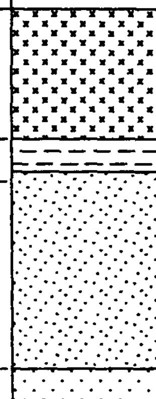


MONITOR WELL COMPLETION DATA

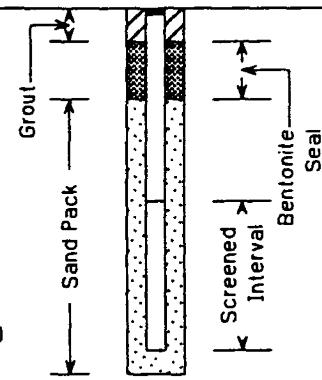
CLIENT- HAZWRAP	WELL I.D.- MANG-4-MW1A
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 10/24/90
SITE- 4	WELL DEPTH (ft)- 11.2 BGL
GROUND ELEVATION (ft-MSL)- 3662.50 MSL	DEPTH TO WATER (ft)- 6.92
TOC ELEVATION (ft)- 3664.70 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 8	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- G. Pierson	SCREEN MATERIAL- 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION
0		SOIL, light to dark gray, sandy, silty, with sandstone fragments and some clay content.
5		CLAY, brown-gray, plastic.
		SAND, brown-red, fine to medium-grained, very little clay.
10		SANDSTONE, brown-red, very weathered and broken.
		Total Depth = 12.0' BGL
15		
20		
25		
30		
35		
40		

GRAPHIC LOG



WELL DIAGRAM

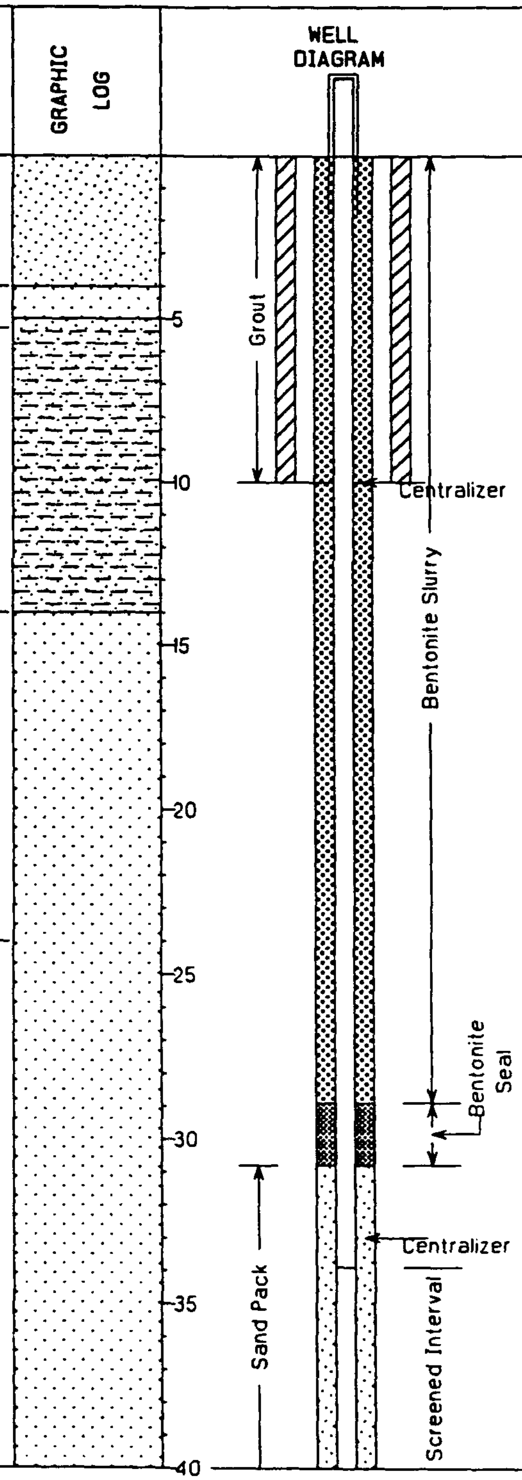


MONITOR WELL COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-5-MW1
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 10/16/90
SITE- 5	WELL DEPTH (ft)- 54.4 BGL
GROUND ELEVATION (ft-MSL)- 3661.50 MSL	DEPTH TO WATER (ft)- 42.40
TOC ELEVATION (ft)- 3664.02 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- G. Pierson	SCREEN MATERIAL- 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION
0		SAND, chocolate brown, fine to medium-grained, with some silts and clays, cuttings were moist.
4		SANDSTONE, grayish white, weathered, fine grained.
5		SANDSTONE, SAND, and CLAY, all are orange-brown and damp to the touch.
14		SANDSTONE, brown to red-brown, fine-grained, hard, poorly indurated, circular iron-staining, occasional small vug with black, soft material filling some vugs, prominent fractures.
24		SANDSTONE, tan, brown with red tint, very fine to fine-grained, hard, poorly indurated, porous, horizontal fractures, vugs that are both circular and elongated and mainly < 1/16" in diameter with one at 36' BGL that was .25' long and .25" wide. Also circular and elliptical iron-staining, some vugs filled with iron deposits.

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

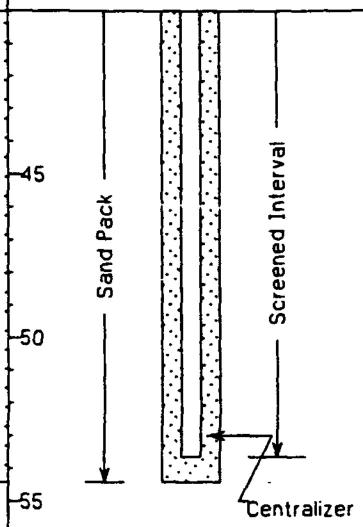


MONITOR WELL COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-5-MW1
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 10/16/90
SITE- 5	WELL DEPTH (ft)- 54.4 BGL
GROUND ELEVATION (ft-MSL)- 3661.50 MSL	DEPTH TO WATER (ft)- 42.40
TOC ELEVATION (ft)- 3664.02 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- G. Pierson	SCREEN MATERIAL- 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION	GRAPHIC LOG	WELL DIAGRAM
40–50		SANDSTONE, with 0.2'-thick layer of hard, crystalline, light gray, fine to medium with some coarse-grain sandstone from 49.8-50.0' BGL and another small layer (< 0.1') at 45' BGL.		
50–54		SANSTONE, black-gray, intermixed with the light gray, hard sandstone, ranges from very fine to medium-grained, has a swirl appearance, is a gradational contact that begins at 51' BGL and is very apparent at 52' BGL.		
		Total Depth = 54' BGL		

Depth scale: 40, 45, 50, 55, 60, 65, 70, 75, 80



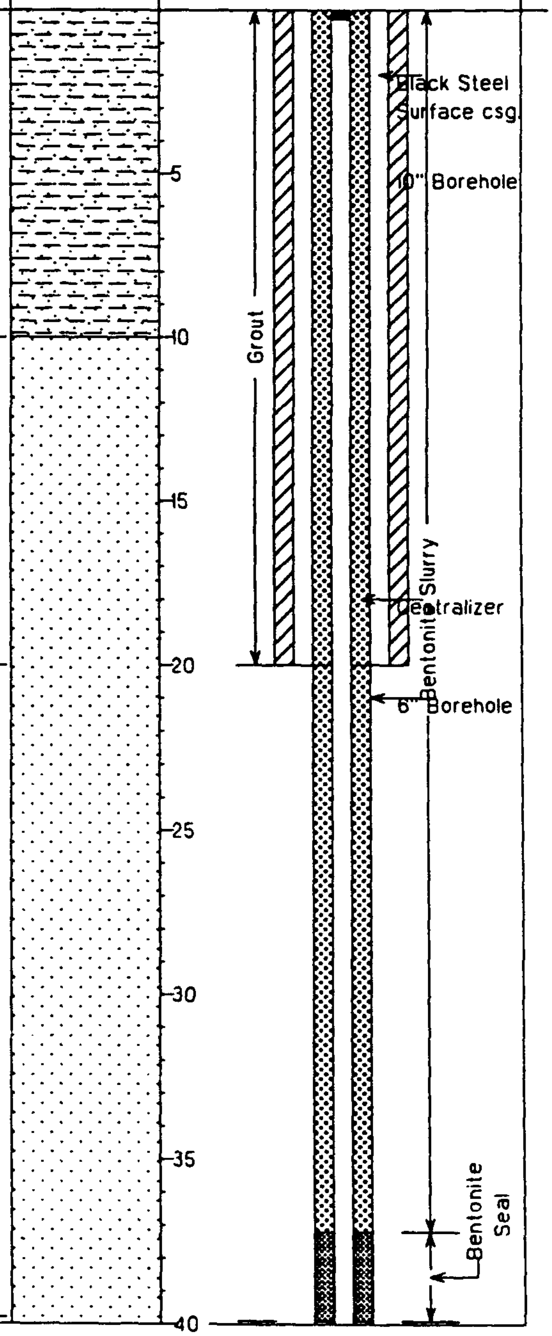
MONITOR WELL COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-6-MW1
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 10/22/90
SITE- 6	WELL DEPTH (ft)- 65 BGL
GROUND ELEVATION (ft-MSL)- 3675.70 MSL	DEPTH TO WATER (ft)- 51.37
TOC ELEVATION (ft)- 3675.40 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- G. Pierson	SCREEN MATERIAL- 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION
0–10		Weathered layers of sandstone and clays, brown-red.
10–20	10–17	SANDSTONE, brown, fine to medium grain, weathered, iron staining, intermittent laminate clays; core showed no obvious signs of contamination and no HNu readings but reading inside drill pipe was 250 ppm.
		Reamed hole to 20' with 9 7/8" bit and set 6" surface casing.
20–35	20–35	SANDSTONE, tan-brown, fine grained, poorly indurated, horizontal fractures, very few vugs (< 1/32"), porous, an ocassional weathered layer of broken up sandstone.
35–40	35–40	SANDSTONE, same as above.

GRAPHIC LOG

WELL DIAGRAM



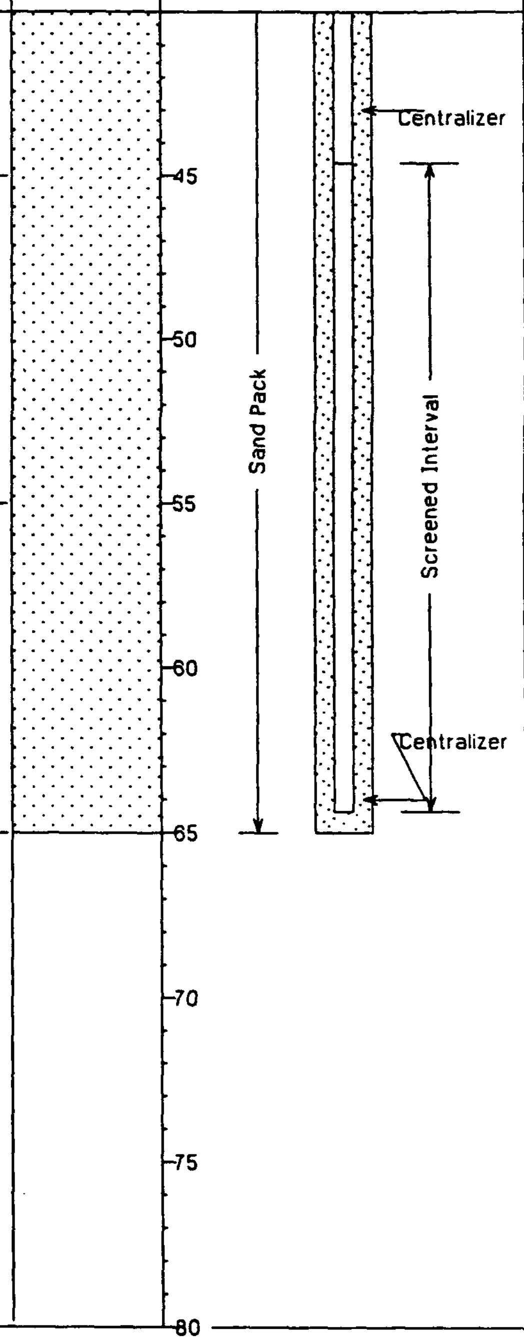
MONITOR WELL COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-6-MW1
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 10/22/90
SITE- 6	WELL DEPTH (ft)- 65 BGL
GROUND ELEVATION (ft-MSL)- 3675.70 MSL	DEPTH TO WATER (ft)- 51.37
TOC ELEVATION (ft)- 3675.40 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- G. Pierson	SCREEN MATERIAL- 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION
40–45	X	SANDSTONE, light gray, very hard, well indurated (siliceous cement), crystalline, fine to medium grained. SANDSTONE, same as 35'-39.8'
45–55	X	SANDSTONE, brown, fine to medium grained, horizontal fractures, very few vugs (< 1/32"), an occasional laminate (< 0.05') of the light gray, hard, crystalline sandstone descibed above with pockets of the gray sandstone occuring throughout core.
55–65	X	SANDSTONE, dark gray, fine to medium grained, pockets of light gray sandstone and laminae of dark gray shale (fissile) occur throughout.
65		*Total Depth = 65' BGL*

GRAPHIC LOG

WELL DIAGRAM

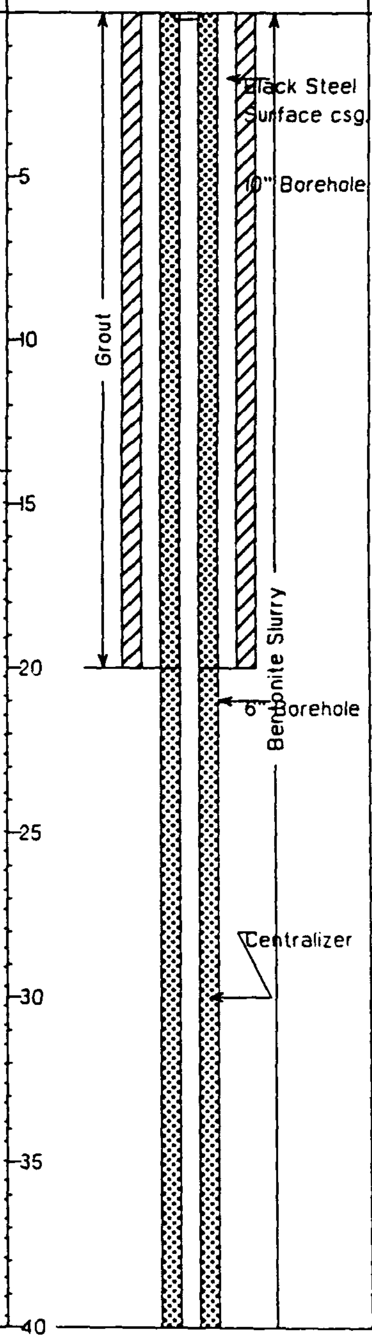


MONITOR WELL COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-7-MW1
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 10/23/90
SITE- 7	WELL DEPTH (ft)- 73.90 BGL
GROUND ELEVATION (ft-MSL)- 3674.40 MSL	DEPTH TO WATER (ft)- 52.76
TOC ELEVATION (ft)- 3674.13 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- G. Pierson	SCREEN MATERIAL- 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION	GRAPHIC LOG
0		Weathered layers of sandstone and clay, red brown.	
14		SANDSTONE, brown with red tint, weathered, highly fractured, fine grained, intermittent clay laminae, usually along horizontal fractures; no HNu readings from core, but 3 ppm in drill pipe.	
20		Set 20' Surface CSG.	
21		SANDSTONE, brown to orange-brown, fine grained, horizontal fractures, some iron staining, very few vugs (< 1/32"), poorly indurated, porous.	
34		SANDSTONE, same as above becoming mottled with darker finer grain material from 44' - 49' BGL.	
40			

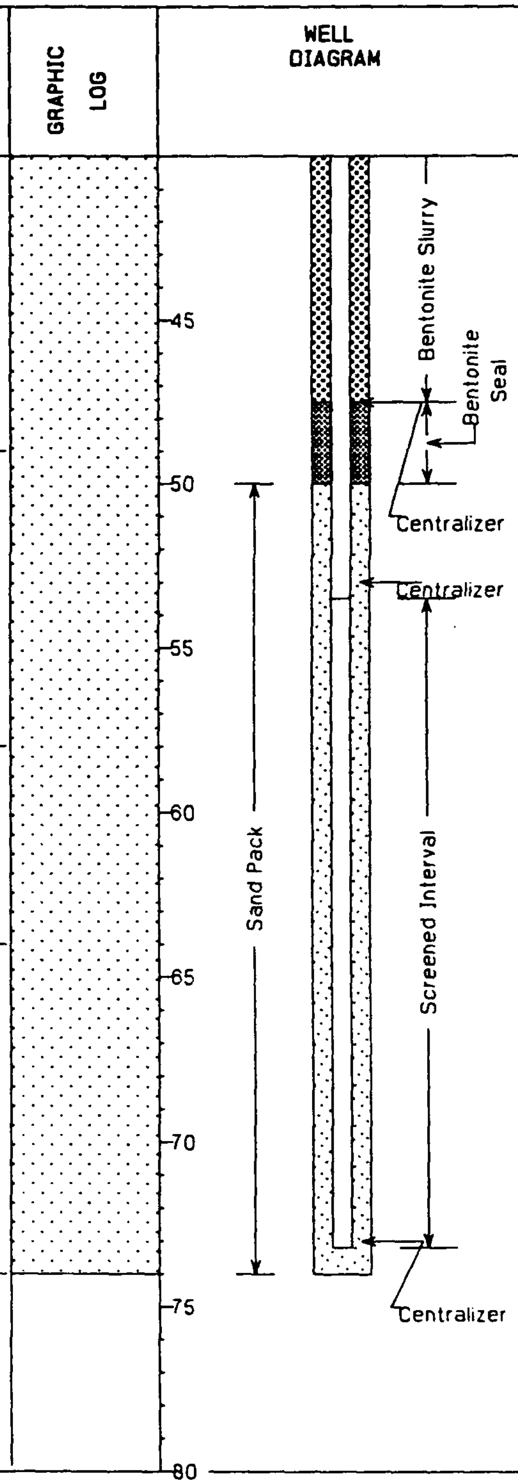
WELL DIAGRAM



MONITOR WELL COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-7-MW1
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 10/23/90
SITE- 7	WELL DEPTH (ft)- 73.90 BGL
GROUND ELEVATION (ft-MSL)- 3674.40 MSL	DEPTH TO WATER (ft)- 52.76
TOC ELEVATION (ft)- 3674.13 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- G. Pierson	SCREEN MATERIAL- 0.020" slots

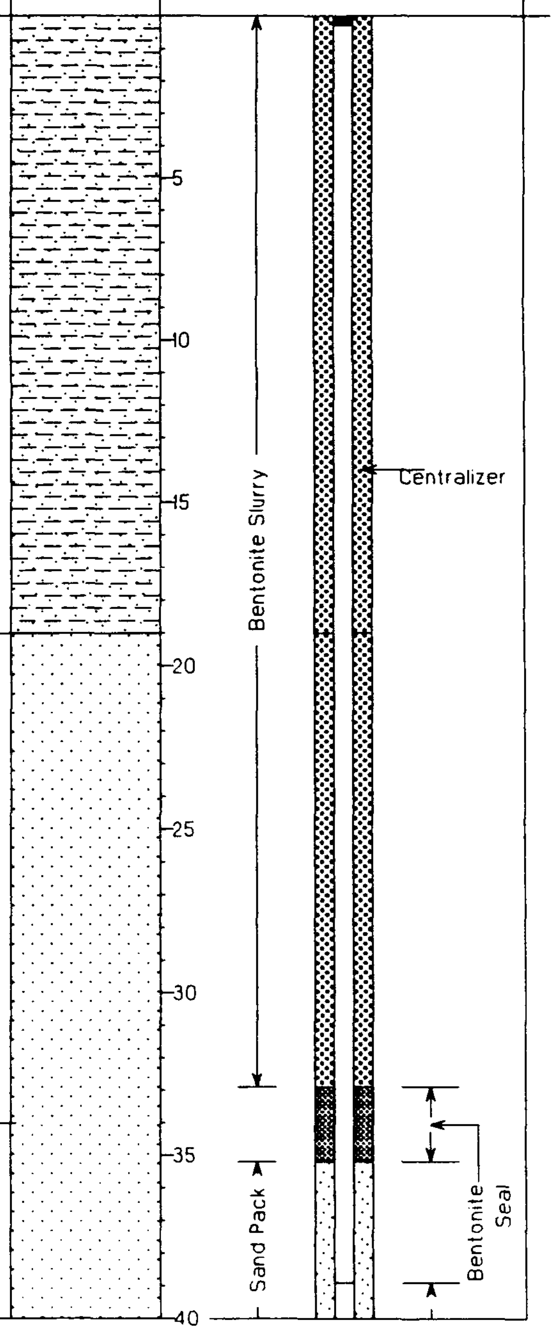
DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION
40–49	X	
49–58	X	SANDSTONE, brown and gray mottled with a hard layer of the light gray, crystalline sandstone at 54.3' - 54.5' BGL.
58–64	X	SANDSTONE, dark gray, very fine grain, mottled with light gray, fine to medium grain, crystalline sandstone horizontal fractures throughout.
64–74	X	SANDSTONE, same as 58'-64', but highly fractured from 64'-67'.
74		*Total Depth = 74' BGL.*



MONITOR WELL COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-8-MW1
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 10/20/90
SITE- 8	WELL DEPTH (ft)- 59.25 BGL
GROUND ELEVATION (ft-MSL)- 3674.90 MSL	DEPTH TO WATER (ft)- 52.97
TOC ELEVATION (ft)- 3674.52 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- G. Pierson	SCREEN MATERIAL- 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION	GRAPHIC LOG	WELL DIAGRAM
0		Weathered sandstones, sands and clays.		
19		SANDSTONE, tan-brown to orange-brown, fine grained, poorly indurated, horizontal fractures with iron staining on surfaces, few very small (1/32" - 1/16") vugs, the sandstone has been poorly worked and contains subangular grains.		
34		Same as above but, with larger vugs (1/16"-1/8"); pinkish gray layer of sandstone from 42' - 43.5'; (47'-49') becomes mottled gradation zone from brown sandstone to dark gray shaly sandstone.		

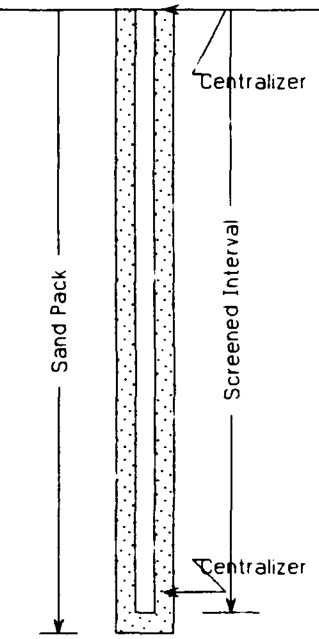


MONITOR WELL COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-8-MW1
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 10/20/90
SITE- 8	WELL DEPTH (ft)- 59.25 BGL
GROUND ELEVATION (ft-MSL)- 3674.90 MSL	DEPTH TO WATER (ft)- 52.97
TOC ELEVATION (ft)- 3674.52 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- G. Pierson	SCREEN MATERIAL- 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION	GRAPHIC LOG	WELL DIAGRAM
40–49	X		dotted	
49–56.5	X	SANDSTONE, same as above with a 0.3' thick layer of light gray crystalline sandstone at 55.2'-55.5'.	dotted	
56.5–59.25	X	SANDSTONE, dark gray, mottled with brown and light gray, horizontal fracrutes, iron staining and deposits in vugs.	dotted	
59.25		*Total Depth = 59.25' BGL.*		

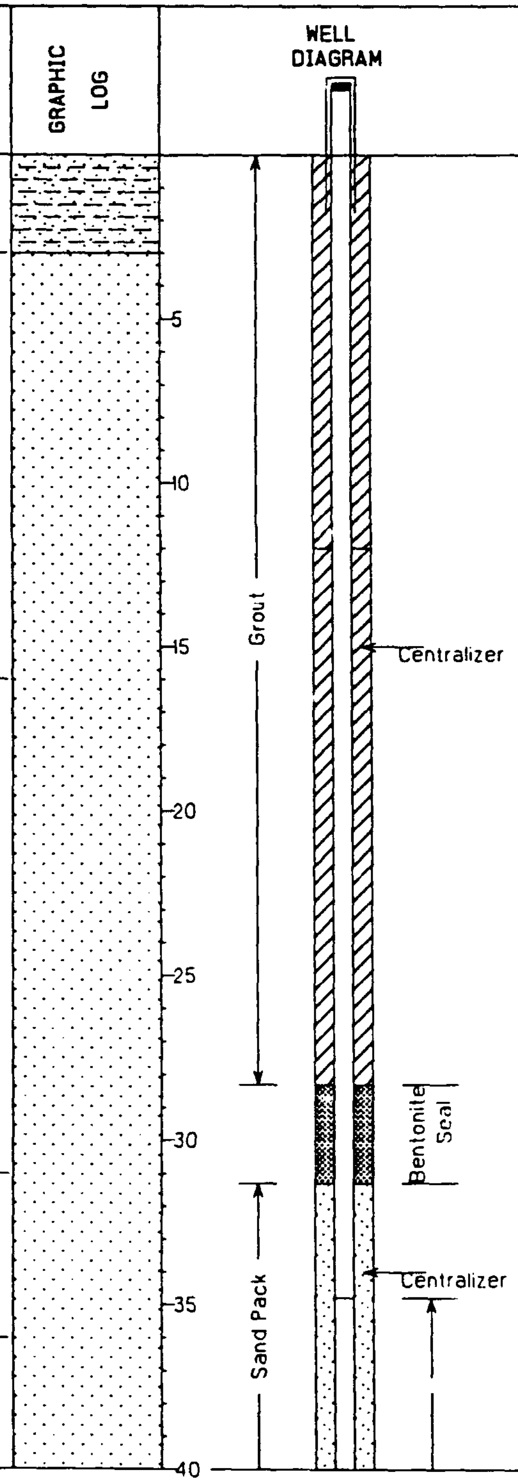
Depth scale: 40, 45, 50, 55, 60, 65, 70, 75, 80



MONITOR WELL COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-BG-MW1
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 10/3/90
SITE- Background	WELL DEPTH (ft)- 55.3 BGL
GROUND ELEVATION (ft-MSL)- 3678.50 MSL	DEPTH TO WATER (ft)- 46.92
TOC ELEVATION (ft)- 3680.89 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- B. Vanderglas	SCREEN MATERIAL- 0.020" slots

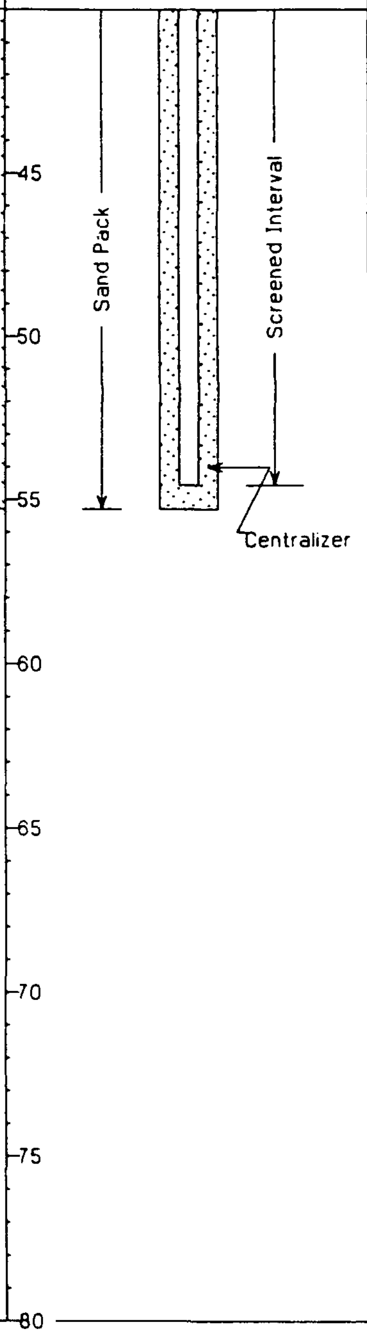
DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION
0		SOIL, SAND, and CLAY.
3		SANDSTONE, fractured, light tan to reddish brown, weathered.
16		SANDSTONE, tan to light brown, hard, with brittle layer at 12-13' BGL, scattered fractures and iron-staining, fine to medium-grained, black specs throughout.
31		SANDSTONE, varigated coloring with reddish brown iron stains, white and light gray markings and scattered black deposits, very hard, well indurated, fine to medium-grained.
36		SANDSTONE, light brown with few large iron stains and white markings, hard, indurated, increasing black deposits with depth.



MONITOR WELL COMPLETION DATA

CLIENT- HAZWRAP	WELL I.D.- MANG-BG-MW1
PROJECT I.D.- Great Falls SI	DATE INSTALLED- 10/3/90
SITE- Background	WELL DEPTH (ft)- 55.3 BGL
GROUND ELEVATION (ft-MSL)- 3678.50 MSL	DEPTH TO WATER (ft)- 46.92
TOC ELEVATION (ft)- 3680.89 MSL	DATE MEASURED- 10/28/90
BOREHOLE DIAMETER (in)- 6	CASING MATERIAL- 2" sch 40 PVC
GEOLOGIST- B. Vanderglas	SCREEN MATERIAL- 0.020" slots

DEPTH (FEET)	SAMPLE	MATERIAL DESCRIPTION	GRAPHIC LOG	WELL DIAGRAM
40–44		SANDSTONE, grayish black, hard, indurated, horizontal fractures with deposits of hard aggregate in some fractures, layer of coal.		
44–55.3		SANDSTONE, grayish black, very fractured, hard, well indurated with interbedded layers of shaly clay that is soft and easily broken.		
55.3		*Total Depth = 55.30' BGL*		



Appendix E

Quality Assurance Report

CONTENTS

TABLES

APPENDIX E

QUALITY ASSURANCE REPORT

INTRODUCTION

As part of the Air Force Installation Restoration Program (IRP), Engineering-Science (ES) conducted geophysical investigations and environmental sampling at the Montana Air National Guard (MANG) base in Great Falls, Montana. All work was performed in accordance with an approved work plan and health and safety plan. A quality assurance/quality control (QA/QC) plan was prepared and approved for use in conjunction with the work plan to ensure generation of valid data.

This quality assurance report presents a summary and assessment of the laboratory and field quality control samples generated throughout the investigation activities. The data are assessed according to the quality assurance objectives of completeness, representativeness, precision, and accuracy. Copies of the analytical samples and QA/QC data generated during the investigation were submitted to HAZWRAP under separate cover. A summary table of the data is included in appendix C.

LEVEL OF QUALITY CONTROL

Data quality objectives (DQOs) are requirements to support decisions through the various stages of remedial actions. Throughout the project planning process, DQOs are supplied through qualitative and quantitative statements. They are specified in such documents as sampling plans, work plans, and quality assurance plans. Five general levels of analytical options to support data collection are identified by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). HAZWRAP has also adopted five levels of QA/QC. They are A, B, C, D, and E, which correlate with levels I, II, III, IV, and V described in *Data Quality Objectives for Remedial Response Activities Development Process* by the USEPA. Selection of a specific level depends on the type of site to be investigated, the level of accuracy and precision required, and the intended use of the data. Levels C, D, and E are those which HAZWRAP deems as valid defensible data for quantitative values.

The analytical activities at the Base require level C quality control (QC) since the sites are near a populated area, are not on the National Priority List (NPL), and are not likely to undergo litigation. Level C QC includes HAZWRAP review and

approval of the laboratory QA plan, the sampling and analysis plan, and the project QAPP. Level C requires the use of contract laboratory program (CLP) protocol for gas chromatograph/mass spectrometry (GS/MS) analysis of volatile and semivolatile organics. All other analyses must be performed using EPA-approved methods or equivalent. Level C also requires a field audit of water and soil sampling activities. The laboratory performing work for a level C project must successfully analyze a performance sample, undergo an audit (administered and evaluated by the HAZWRAP analytical QC specialist), correct deficiencies found during the audit, and provide monthly progress reports on QC. The laboratory that performs level C QC should have successfully analyzed the CLP performance sample within the past year.

Field analyses will be conducted under level B QC. Level B QC applies to screening methods used to provide qualitative and quantitative data rapidly in the field. Field screening methods that will be used for this project and will be subject to level B QC are soil gas survey and field GC screening (volatile hydrocarbons using GC analysis of headspace vapors). This level of QC requires the use of multipoint (at least three) calibration curves, blanks, and continuing calibration. EPA-approved methods or the equivalent will be used when available.

DEVIATIONS FROM THE QA/QC PLAN

Onthree occasions, investigation sampling activities deviated from the QA/QC plan. Only one deviation significantly affected the quality of the data generated.

Sediment samples collected at sites 2 and 6, were composited in the field. This method of sampling is not valid for VOA analyses. It was necessary to flag all the sediment VOA analyses with an "R" qualifer.

Field conductivity measurements were not used in the development of the monitor wells and piezometers. This was due to the unavailability of an acceptable standard. Only temperature and pH measurements were used as criteria to develop the piezometers and monitor wells.

The conductivities of the groundwater samples were measured at the time of collection with a meter which had not been field calibrated with an acceptable standard. The meter was checked with a standard upon returning to the office. The meter reading in the office was accurate, so it is believed that the field conductivity readings are accurate.

SOIL GAS AND GEOPHYSICAL QA/QC EVALUATION

The QA objectives for the soil gas and geophysical surveys were representativeness, completeness, and comparability. Representativeness was preserved by following standard approved collection procedures and prescribed decontamination procedures throughout the SOV surveys. Data collection procedures are consistent with standard practices, so that data generated from this study can be compared with data generated from other studies. This practice maintained the QA objective of comparability.

Completeness can be assessed by comparing the number of data points collected to the number proposed. To best assess completeness at MANG, it is necessary to look at each site individually. The QA objective of 90 percent was met at sites 1 and 6, where all the planned points and some additional points were sampled. The QA objective was also met at site 8, where 100 percent of the proposed points were sampled.

As can be seen from the following table, the completeness objective, as a percent of planned data points, was not met at sites 2, 3, 4, 5, and 7.

Site	Proposed Number of Sampling Points	Actual Number of Points Sampled	Actual/ Proposed
2	45	10	22%
3	60	45	75%
4	60	31	52%
5	60	17	28%
7	20	13	65%

At site 2, 10 of the proposed 45 points, 22 percent were collected. At site 3, 45 of the proposed 60 points, 75 percent, were collected. At site 4, 31 of the proposed 60 points, 52 percent, were collected. At site 5, 17 of the proposed 60 points, 28 percent, and at site 7, 13 of the proposed 20 points, 65 percent, were collected.

While the completeness objectives for the soil gas survey were not met, the overall objectives were met at most sites. At sites 4 and 5, the goal of the soil gas survey was to locate the two former fire training areas. Eventually, aerial photographs, which were not available at the time the work plan was written, were used to locate the sites. Therefore, the full number of planned soil gas points was not necessary.

Soil gas points at site 2 were placed at locations with the greatest likelihood for waste residuals from previous activities (i.e., directly above the pipeline and along the bottom of the ditch). Since significant contamination was detected only in one area of the ditch, the remainder of the planned points were not sampled.

The situation at site 7 was similar. The ground-penetrating radar (GPR) survey was able to determine the location of the dry well. The GPR was also able to confirm that there was only one dry well; therefore, the full number of planned soil gas points was not necessary.

At site 3, the asphalt pile had not been moved prior to the soil gas survey, making it impossible to complete the full grid. However, the grid was completed around the asphalt pile and soil borings were placed within the area occupied by the asphalt.

Soil gas data were evaluated using HAZWRAP level B guidelines. This included verification of initial calibration, continuing calibration, blanks, and duplicates.

Two instruments were used for this sampling event. One instrument was provided by the ES Atlanta office and the second was provided by the Denver office.

The instruments were calibrated to standards at the beginning of the sampling event. The Atlanta and Denver GCs[1] were set using a three-point calibration curve consisting of 100-μL[2], 500-μL and 1,000-μL injections of a standard containing 1 ppm each of the following compounds: 1,1-dichloroethene, 1,2-dichloroethene, benzene, trichloroethene, toluene, o-xylene and m-xylene. Injections of 10 μL were also run on each instrument. These were not used in the curve plotting because some of the peaks were poorly defined at the gain setting used.

Linear curve fits for all compounds were calculated by plotting the concentration of the standards versus the standard areas. These are tabulated in Table E.1. All compounds yielded an acceptable correlation coefficient except o-xylene run on the Atlanta GC, which showed erratic results and a negative correlation coefficient. All data for o-xylene run on the Atlanta GC should be qualified as estimated.

Duplicate soil vapor samples (samples taken from the same soil vapor borehole in sequence and collected in separate Tedlar® bags) are analyzed to determine precision and accuracy. Approximately 10 percent of the samples were to be analyzed as duplicates. The duplicate analyses are summarized in Table E.2 where either the sample or the duplicate was not detected, the RPD was not calculated. It was not possible to accurately establish method detection limits due to instrument variability. These data can be considered to be of valid quality as a screening mechanism for samples which contain analytes at sufficient levels to require further verification and identification by the lab, and to assist in determining locations of soil borings and monitoring wells in the drilling program.

Geophysical survey methods were proposed for use at three sites, sites 6, 7, and 8. The ground-penetrating radar was used at all three, satisfying the completeness objective for the geophysical survey.

ENVIRONMENTAL SAMPLES

Hold Time Analysis

Hold times for sample extraction/preparation and analysis were monitored during the project. A hold time analysis was performed for each site and each medium (soil, sediment, and water). The analysis entailed listing the samples for each site, the date each sample was collected, and the date of sample preparation and analysis for each parameter requested for the sample. The elapsed time from sample collection to sample preparation and analysis was calculated and compared with the hold times specified for the site parameters in the project QA/QC plan.

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[1] GC = gas chromatograph

[2] μL = microliter

Table E.1. Linear Regression Analysis for Soil Gas Standards

Compound	Peak Areas (Vs) 100-μL Injection	500-μL Injection	1000-μL Injection	Correlation Coefficient
Denver GC				
1,1 DCE	1.3	7.6	17.2	0.9985
1,2 DCE	1.3	8.4	17.1	0.9999
Benzene	2.1	12.0	24.4	1.00
TCE	1.7	13.7	31.1	0.9992
Toluene	1.6	10.2	39.1	0.9716
o-Xylene	-	0.2161	0.4123	1.00
m-Xylene	1.2	6.9	15.1	0.9992
Atlanta GC				
1,1 DCE	1.0	5.9	14.4	1.00
1,2 DCE	1.1	6.6	15.5	0.9975
Benzene	1.3	10.3	23.3	0.9992
TCE	1.6	10.4	22.3	0.9998
Toluene	1.6	12.1	30.0	0.9964
o-Xylene*	1.3	0.506	0.795	-0.5773
m-Xylene	1.3	7.7	15.7	1.00

* Qualified – estimated.

Table E.2 Duplicate Analysis on Soil Gas Samples
(Field Gas Chromatograph)

Sample ID	Compound	Sample Concentration (ppb)	Duplicate Concentration (ppb)	Mean Concentration (ppb)	Relative Percent Difference (RPD) (%)
MANG-1-SGD12	o-Xylene	300	ND	NA	NA
MANG-1-SGD10	Toluene	33	9	21	105
	o-Xylene	97	ND	NA	NA
MANG-1-SGD7	Toluene	8	8	8	0
	o-Xylene	300	40	170	153
MANG-1-SGA6	Toluene	12	14	13	15
MANG-1-SGAA3	Toluene	12	ND	NA	NA
MANG-1-SGC0	Toluene	8	ND	NA	NA
MANG-1-SGF1	Toluene	18	ND	NA	NA
MANG-3-SGX6	Toluene	11	37	24	108
MANG-3-SGB1		ND	ND	NA	NA
MANG-3-SGB4	Toluene	21	ND	NA	NA
MANG-3-SGA7	Toluene	9	ND	NA	NA
MANG-5-SGC2	1,1-Dichloroethene	14	ND	NA	NA
MANG-5-SGB5	Trichloroethene	8	ND	NA	NA
MANG-4-SGC2		ND	ND	NA	NA
MANG-7-SGA1	1,2-Dichloroethene	13	ND	NA	NA
	Trichloroethene	36	ND	NA	NA
	Toluene	15	ND	NA	NA
MANG-7-SGC4	Trichloroethene	6	15	11	82
MANG-8-SGA3	1,2-Dichloroethene	0.1	ND	NA	NA
	o-Xylene	0.2	ND	NA	NA
MANG-6-SGY5					
	Toluene	32,000	272	16,136	197
MANG-6-SGX0	Toluene	8	24	16	100
	o-Xylene	1,450	1,300	1,375	11

ND = not detected

NA = not applicable

$$RPD = \left| \frac{\text{Concentration sample - Concentration duplicate}}{(\text{Concentration sample + Concentration duplicate})/2} \right| \times 100\%$$

Tables E.3 and E.4 present the results of this analysis for the samples collected from each of the sites. The hold time analysis results for all the field QA/QC samples are in Table E.5; for the water tank and drum sampling; in Table E.6; and for the second round of groundwater sampling, in Table E.7.

In these tables, an asterisk (*) adjacent to the elapsed time indicates that the hold time specified in the project QA/QC plan was exceeded. If the elapsed time for a sample extraction or analysis exceeded the EPA-specified hold time, the data resulting from that analysis were flagged by a "J" qualifier and used as estimated values. If, in the judgment of the laboratory or the data validator, the data were unusable, an "R" qualifier was added. The "R" qualifier, as defined by the HAZWRAP document "Requirements for Quality Control of Analytical Data" (HAZWRAP, 1988), signifies that the data are invalid and should be rejected. The flags were added to the summary tables presented in the report.

Laboratory QC Samples

Quality control samples were analyzed routinely by the laboratory as part of the laboratory quality control program. Laboratory-based quality control sample analyses constituted at least 10 percent of each data set generated and consisted of blanks, replicates, standards, and surrogate and matrix spikes. Results of these analyses are included with the environmental sample data and are available upon request from the 120th FIG or the NGB. A brief discussion of the laboratory QC samples is presented below, along with a description of the corrective actions taken, as necessary, to ensure the quality of the data control samples. A more detailed description of the laboratory QC samples can be found in the case narratives accompanying each set of data.

Reagent Blanks

Reagent blanks were run for all appropriate analyses to verify that the laboratory equipment or environment did not introduce contaminants that would affect analytical results. For example, common lab solvent such as acetone and methylene chloride may be detected in the blanks as well as the samples. If an organic constituent was found in the blank as well as the environmental sample, the data for the sample were flagged with a "B" qualifier. For each analyte found in a reagent blank, the sample data were compared with the blank data, as specified in DOE/HWP-65. For common laboratory contaminants, if the concentration of the analyte in the sample was less than 10 times the concentration in the blank, the sample was reported as "not detected" for that analyte and a "U" qualifier was added to the data. For other constituents, the criterion was 5 times the concentration in the blank. Concentrations of constituents detected in blanks were not subtracted from the analytical sample data.

Table E.3. Hold Time Analysis for Soil Samples

Sample I.D.	Date Sampled	Total Metals ICP Analysis	Exceptions to ICP Analysis Dates	Total Arsenic Analysis	Total Lead Analysis	Total Selenium Analysis	Total Mercury Analysis	CLP Semivolatiles Extraction	CLP Semivolatiles Analysis	CLP Volatiles Analysis	TPH EPA 418.1 Analysis
MANG 1 SB1 2	09/18	09/28 10	Cd - 9/29/90	10/04 16	10/02 14	10/02 14	10/10 22	09/25 7	10/10 15	09/30 12	09/25 7
MANG 1 SB2 1	09/18	09/28 10	Cd - 9/29/90	10/04 16	10/02 14	10/02 14	10/10 22	09/25 7	10/11 16	09/30 12	09/25 7
MANG 1 SB2 3	09/18	09/28 10	Cd - 9/29/90	10/04 16	10/02 14	10/02 14	10/10 22	09/25 7	10/10 15	10/02 14	09/25 7
MANG 1 SB3 1	09/18	09/28 10	Cd - 9/29/90	10/05 17	10/02 14	10/02 14	10/10 22	10/02 14	10/11 9	10/02 14	09/25 7
MANG 1 SB3 3	09/18	09/28 10	Cd - 9/29/90	10/05 17	10/02 14	10/02 14	10/10 22	09/25 7	10/11 16	09/30 12	09/25 7
MANG 1 SB5 1	09/18	09/28 10	Cd - 9/29/90	10/05 17	10/02 14	10/02 14	10/10 22	09/25 7	10/11 16	10/02 14	09/25 7
MANG 1 SB5 3.5	09/18	09/28 10	Cd - 9/29/90	10/05 17	10/02 14	10/02 14	10/10 22	10/02 14	10/11 9	09/30 12	09/25 7
MANG 1 SB0 1.5	09/19	09/28 9	Cd - 9/29/90	10/05 16	10/02 13	10/02 13	10/10 21	09/25 6	10/10 15	09/30 11	09/25 6
MANG 1 SB4 1.5	09/19	09/28 9	Cd - 9/29/90	10/05 16	10/02 13	10/02 13	10/10 21	10/02 13	10/11 9	09/30 11	09/25 6
MANG 1 SB6 1	09/19	09/28 9	Cd - 9/29/90	10/05 16	10/02 13	10/02 13	10/10 21	09/25 6	10/11 16	10/02 13	09/25 6
MANG 1 SB6 3.5	09/19	09/28 9	Cd - 9/29/90	10/05 16	10/02 13	10/02 13	10/10 21	09/25 6	10/11 16	10/02 13	09/25 6
MANG 1 SB7 1	09/19	09/28 9	Cd - 9/29/90	10/05 16	10/02 13	10/02 13	10/10 21	10/02 13	10/11 9	10/02 13	09/25 6
MANG 1 SB8 1	09/19	09/28 9	Cd - 9/29/90	10/05 16	10/02 13	10/02 13	10/10 21	09/25 6	10/11 16	10/02 13	09/25 6
MANG 1 SB9 1	09/19	09/28 9	Cd - 9/29/90	10/05 16	10/02 13	10/02 13	10/10 21	09/25 6	10/11 16	10/02 13	09/25 6
MANG 2 SB1 1.5	09/19	10/02 13	Cd - 10/5/90	10/09 20	10/04 15	10/11 22	10/10 21	09/25 6	10/09 14	10/03 14	10/01 12
MANG 2 SB2 1.5	09/19	10/02 13	Cd - 10/5/90	10/09 20	10/04 15	10/11 22	10/10 21	09/25 6	10/09 14	10/03 14	10/01 12
MANG 2 SB2 3	09/19	10/02 13	Cd - 10/5/90	10/09 20	10/04 15	10/11 22	10/10 21	09/25 6	10/09 14	10/03 14	10/01 12
MANG 2 SB3 1	09/20	10/02 12	Cd - 10/5/90	10/09 19	10/04 14	10/11 21	10/10 20	09/25 5	10/09 14	10/03 13	10/01 11
MANG 2 SB4 2	09/20	10/02 12	Cd - 10/5/90	10/09 19	10/04 14	10/11 21	10/10 20	09/25 5	10/09 14	10/03 13	10/01 11
MANG 2 SB5 1	09/20	10/02 12	Cd - 10/5/90	10/09 19	10/04 14	10/11 21	10/10 20	10/03 13	10/05 2	10/03 13	10/01 11
MANG 2 SB5 2	09/20	10/02 12	Cd - 10/5/90	10/09 19	10/04 14	10/11 21	10/10 20	10/03 13	10/05 2	10/03 13	10/01 11
MANG 2 SB6 1	09/20	10/02 12	Cd - 10/5/90	10/09 19	10/04 14	10/11 21	10/10 20	10/04 14	10/05 1	10/04 14	10/01 11
MANG 2 SB6 2	09/20	10/02 12	Cd - 10/5/90	10/09 19	10/04 14	10/11 21	10/10 20	09/26 6	10/05 9	10/04 14	10/01 11
MANG 4 SB1 1	09/20	10/02 12	Cd - 10/5/90	10/10 20	10/04 14	10/11 21	10/10 20	09/26 6	10/05 9	10/04 14	10/01 11
MANG 4 SB1 5.5	09/20	10/02 12	Cd - 10/5/90	10/10 20	10/04 14	10/11 21	10/10 20	09/26 6	10/05 9	10/04 14	10/01 11
MANG 4 SB2 1	09/20	10/02 12	Cd - 10/5/90	10/09 19	10/04 14	10/11 21	10/10 20	09/26 6	10/17 21	10/04 14	10/01 11
MANG 4 SB2 3.5	09/20	10/02 12	Cd - 10/5/90	10/09 19	10/04 14	10/11 21	10/10 20	09/26 6	10/15 19	10/04 14	10/01 11
MANG 4 SB3 3	09/20	10/02 12	Cd - 10/5/90	10/09 19	10/04 14	10/11 21	10/10 20	09/26 6	10/15 19	10/04 14	10/01 11
MANG 4 SB3 7	09/20	10/02 12	Cd - 10/5/90	10/09 19	10/04 14	10/11 21	10/10 20	09/26 6	10/17 21	10/04 14	10/01 11
MANG 4 SB0 1	09/21	10/02 11	Cd - 10/5/90	10/09 18	10/09 18	10/11 20	10/10 19	09/26 5	10/13 17	10/05 14	10/01 10
MANG 4 SB0 3.5	09/21	10/09 18	Cd - 10/10/90, Cr - 10/10/9	10/10 19	10/09 18	10/12 21	10/17 26	09/26 5	10/15 19	10/05 14	10/01 10

Key:
10/18 = the date the analysis (or extraction) was performed (1990)
10 = the number of days from date sampled to date of analysis (or extraction)
[Except: CLP semivolatiles = the number of days from date extracted to date analyzed]
* = analysis (or extraction) was performed outside of contract holding time
NA = not applicable

Table E.3, continued

Sample I.D.	Date Sampled	Total Metals ICP Analysis	Exceptions to ICP Analysis Dates	Total Arsenic Analysis	Total Lead Analysis	Total Selenium Analysis	Total Mercury Analysis	CLP Semivolatiles Extraction	CLP Semivolatiles Analysis	CLP Volatiles Analysis	TPH EPA 418.1 Analysis
MANG 4 SB4 1.5	09/21	10/09 18	Cd - 10/10/90, Cr - 10/10/9	10/10 19	10/09 18	10/12 21	10/17 26	09/26 5	10/17 21	10/05 14	10/01 10
MANG 4 SB4 7	09/21	10/09 18	Cd - 10/10/90, Cr - 10/10/9	10/10 19	10/09 18	10/12 21	10/17 26	09/26 5	10/15 19	10/05 14	10/01 10
MANG 4 SB5 1.5	09/21	10/09 18	Cd - 10/10/90, Cr - 10/10/9	10/10 19	10/09 18	10/12 21	10/17 26	09/26 5	10/17 21	10/05 14	10/01 10
MANG 4 SB5 3.5	09/21	10/09 18	Cd - 10/10/90, Cr - 10/10/9	10/09 18	10/09 18	10/12 21	10/17 26	09/26 5	10/15 19	10/05 14	10/01 10
MANG 6 SB1 1.5	09/24	10/02 8	Cd - 10/5/90	10/09 15	10/04 10	10/11 17	10/10 16	09/26 2	10/17 21	10/05 11	10/09 15
MANG 6 SB1 3.5	09/24	10/02 8	Cd - 10/5/90	10/09 15	10/04 10	10/11 17	10/10 16	09/26 2	10/17 21	10/05 11	10/09 15
MANG 6 SB2 1.5	09/24	10/02 8	Cd - 10/5/90	10/09 15	10/04 10	10/11 17	10/10 16	09/26 2	10/13 17	10/08 14	10/09 15
MANG 6 SB2 7	09/24	10/02 8	Cd - 10/5/90	10/09 15	10/04 10	10/11 17	10/10 16	09/26 2	10/17 21	10/05 11	10/09 15
MANG 6 SB3 5.5	09/24	10/09 15	Cd - 10/10/90, Cr - 10/10/9	10/10 16	10/09 15	10/12 18	10/17 23	10/10 16 ♦	10/14 4	10/10 16 ♦	10/09 15
MANG 6 SB4 5	09/25	10/09 14	Cd - 10/10/90, Cr - 10/10/9	10/10 15	10/09 14	10/12 17	10/17 22	10/10 15 ♦	10/22 12	10/10 15 ♦	10/09 14
MANG 6 SB5 3.5	09/25	10/09 14	Cd - 10/10/90, Cr - 10/10/9	10/10 15	10/09 14	10/12 17	10/17 22	10/05 10	10/08 3	10/09 14	10/09 14
MANG 6 SB6 3.5	09/25	10/09 14	Cd - 10/10/90, Cr - 10/10/9	10/10 15	10/09 14	10/12 17	10/17 22	10/05 10	10/08 3	10/09 14	10/09 14
MANG 8 SB1 1.5	09/26	10/09 13	Cd - 10/10/90, Cr - 10/10/9	10/10 14	10/09 13	10/12 16	10/17 21	10/05 9	10/11 6	10/10 14	10/09 13
MANG 8 SB2 3	09/26	10/09 13	Cd - 10/10/90, Cr - 10/10/9	10/10 14	10/09 13	10/12 16	10/17 21	10/05 9	10/11 6	10/09 13	10/09 13
MANG 8 SB3 3	09/26	10/09 13	Cd - 10/10/90, Cr - 10/10/9	10/10 14	10/09 13	10/12 16	10/17 21	10/02 6	10/10 8	10/11 15 ♦	10/09 13
MANG 7 SB1 1.5	09/27	10/09 12	Cd - 10/10/90, Cr - 10/10/9	10/10 13	10/09 12	10/12 15	10/17 20	10/10 13	10/19 9	10/11 14	10/09 12
MANG 7 SB2 1	09/27	10/09 12	Cd - 10/10/90, Cr - 10/10/9	10/10 13	10/09 12	10/12 15	10/17 20	10/02 5	10/10 8	10/11 14	10/09 12
MANG 8 SB4 1.5	09/27	10/09 12	Cd - 10/10/90, Cr - 10/10/9	10/10 13	10/09 12	10/12 15	10/17 20	10/02 5	10/10 8	10/11 14	10/09 12
MANG 8 SB4 5.5	09/27	10/09 12	Cd - 10/10/90, Cr - 10/10/9	10/10 13	10/09 12	10/12 15	10/17 20	10/02 5	10/10 8	10/11 14	10/09 12
MANG 8 SB5 1	09/27	10/09 12	Cd - 10/10/90, Cr - 10/10/9	10/10 13	10/09 12	10/12 15	10/17 20	10/02 5	10/10 8	10/11 14	10/09 12
MANG 8 SB5 5.5	09/27	10/09 12	Cd - 10/10/90, Cr - 10/10/9	10/10 13	10/09 12	10/12 15	10/17 20	10/02 5	10/10 8	10/11 14	10/09 12
MANG 8 SB6 1.5	09/27	10/09 12	Cd - 10/10/90, Cr - 10/10/9	10/10 13	10/09 12	10/12 15	10/17 20	10/02 5	10/10 8	10/11 14	10/09 12
MANG 3 SB6 1	09/28	10/23 25		10/18 20	10/18 20	10/18 20	10/24 26	10/12 14	10/19 7	10/11 13	10/09 11
MANG 3 SB7 1.5	09/28	10/23 25		10/18 20	10/18 20	10/18 20	10/24 26	10/05 7	10/17 12	10/12 14	10/09 11
MANG 3 SB8 1.5	09/28	10/23 25		10/18 20	10/18 20	10/18 20	10/24 26	10/12 14	10/19 7	10/12 14	10/09 11
MANG 3 SB9 1.5	09/28	10/23 25		10/19 21	10/18 20	10/18 20	10/24 26	10/05 7	10/17 12	10/12 14	10/09 11
MANG 3 SB10 1.5	09/28	10/23 25		10/19 21	10/18 20	10/18 20	10/24 26	10/05 7	10/17 12	10/11 13	10/09 11
MANG BG SB1 1	09/29	10/23 24		10/19 20	10/18 19	10/18 19	10/24 25	10/08 9	10/18 10	10/12 13	10/09 10
MANG BG SB1 3.5	09/29	10/23 24		10/19 20	10/18 19	10/18 19	10/24 25	10/08 9	10/23 15	10/12 13	10/09 10
MANG BG SB2 1	09/29	10/23 24		10/19 20	10/18 19	10/18 19	10/24 25	10/08 9	10/23 15	10/13 14	10/09 10
MANG BG SB2 3	09/29	10/23 24		10/19 20	10/18 19	10/18 19	10/24 25	10/08 9	10/18 10	10/13 14	10/09 10

Key:

10/18 = the date the analysis (or extraction) was performed (1990)
10 = the number of days from date sampled to date of analysis (or extraction)
[Except: CLP semivolatiles = the number of days from date extracted to date analyzed]

♦ = analysis (or extraction) was performed outside of contract holding time
NA = not applicable

Table E.3, continued

Sample I.D.	Date Sampled	Total Metals ICP Analysis	Exceptions to ICP Analysis Dates	Total Arsenic Analysis	Total Lead Analysis	Total Selenium Analysis	Total Mercury Analysis	CLP Semivolatiles Extraction	CLP Semivolatiles Analysis	CLP Volatiles Analysis	TPH EPA 418.1 Analysis
MANG BG SB3 1	09/29	10/23 24		10/19 20	10/18 19	10/18 19	10/24 25	10/08 9	10/24 16	10/13 14	10/09 10
MANG BG SB3 3.5	09/29	10/23 24		10/19 20	10/18 19	10/18 19	10/24 25	10/08 9	10/24 16	10/13 14	10/09 10
MANG 5 SB1 3.5	09/29	10/23 24		10/22 23	10/18 19	10/18 19	10/24 25	10/08 9	10/23 15	10/12 13	10/09 10
MANG 5 SB1 7.5	09/29	10/23 24		10/22 23	10/18 19	10/18 19	10/24 25	10/08 9	10/23 15	10/12 13	10/09 10
MANG 5 SB2 1	09/29	10/23 24		10/22 23	10/18 19	10/18 19	10/24 25	10/08 9	10/23 15	10/12 13	10/09 10
MANG 5 SB3 1.5	09/29	10/23 24		10/22 23	10/18 19	10/18 19	10/24 25	10/08 9	10/24 16	10/12 13	10/09 10
MANG 5 SB3 5	09/29	10/23 24		10/22 23	10/18 19	10/18 19	10/24 25	10/08 9	10/23 15	10/12 13	10/09 10
MANG 5 SB4 5.5	09/29	10/23 24		10/22 23	10/18 19	10/18 19	10/24 25	10/12 13	10/24 12	10/12 13	10/09 10
MANG 7 SB3 3.5	09/27	10/23 26		10/19 22	10/18 21	10/18 21	10/24 27	10/08 11	10/26 18	10/11 14	10/09 12
MANG 7 SB3 5.5	09/27	10/23 26		10/19 22	10/18 21	10/18 21	10/24 27	10/08 11	10/17 9	10/11 14	10/09 12
MANG 7 SB4 5	09/28	10/23 25		10/19 21	10/18 20	10/18 20	10/24 26	10/08 10	10/18 10	10/12 14	10/09 11
MANG 3 SB1A 1.5	10/09	10/29 20		10/30 21	10/26 17	10/29 20	10/30 21	10/12 3	10/25 13	10/15 6	10/30 21
MANG 3 SB2A 1.5	10/09	10/29 20		10/30 21	10/26 17	10/29 20	10/30 21	10/12 3	10/26 14	10/17 8	10/30 21
MANG 3 SB2A 3.5	10/09	10/29 20		10/30 21	10/26 17	10/29 20	10/30 21	10/12 3	10/26 14	10/17 8	10/30 21
MANG 3 SB3A 1.0	10/09	10/29 20		10/30 21	10/26 17	10/29 20	10/30 21	10/12 3	10/26 14	10/17 8	10/30 21
MANG 3 SB0A 1.0	10/09	10/29 20		10/30 21	10/26 17	10/29 20	10/30 21	10/12 3	10/26 14	10/17 8	10/30 21
MANG 3 SB5A 1.5	10/09	10/29 20		10/30 21	10/26 17	10/29 20	10/30 21	10/12 3	10/26 14	10/19 10	10/30 21
MANG 6 SB7 1.0	10/10	10/29 19		10/30 20	10/26 16	10/29 19	10/30 20	10/12 2	11/02 21	10/19 9	10/26 16
MANG 6 SB0 1.0	10/10	10/29 19		10/30 20	10/26 16	10/29 19	10/30 20	10/12 2	10/26 14	10/17 7	10/26 16
MANG 6 SB8 1.5	10/10	10/29 19		10/30 20	10/26 16	10/29 19	10/30 20	10/12 2	10/29 17	10/17 7	10/26 16
MANG 6 SB9 1.0	10/10	10/29 19		10/30 20	10/26 16	10/29 19	10/30 20	10/12 2	11/01 20	10/17 7	10/26 16
MANG 6 SB10 1.5	10/10	10/29 19		10/30 20	10/26 16	10/29 19	10/30 20	10/12 2	10/29 17	10/19 9	10/26 16
MANG 6 SB11 1.3	10/10	10/29 19		10/30 20	10/26 16	10/29 19	10/30 20	10/12 2	11/02 21	10/19 9	10/26 16
MANG 6 SB12 3.5	10/10	10/29 19		10/31 21	10/26 16	10/29 19	10/30 20	10/12 2	11/01 20	10/19 9	10/26 16
MANG 6 SB13 1.0	10/11	10/29 18		10/31 20	10/26 15	10/29 18	10/30 19	10/19 8	11/12 24	10/22 12	11/02 22
MANG 6 SB14 5.5	10/11	10/29 18		10/31 20	10/26 15	10/29 18	10/30 19	10/19 8	11/12 24	10/22 11	11/02 22

Key:
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[Except: CLP semivolatiles = the number of days from date extracted to date analyzed]

* = analysis (or extraction) was performed outside of contract holding time
NA = not applicable

Table E.4. Hold Time Analysis for Sediment Samples

Sample I.D.	Date Sampled	Total Metals ICP Analysis		Total Arsenic Analysis		Total Lead Analysis		Total Selenium Analysis		Total Mercury Analysis		CLP Semivolatiles Extraction		CLP Semivolatiles Analysis		CLP Volatiles Analysis		TPH EPA 418.1 Analysis	
MANG 6 SD0	10/11	10/29	18	10/31	20	10/26	15	10/29	18	10/30	19	10/20	9	11/12	23	10/23	12	11/02	22
MANG 6 SD1	10/11	10/29	18	10/31	20	10/29	18	10/30	19	11/01	21	10/20	9	11/12	23	10/23	12	11/02	22
MANG 6 SD2	10/11	10/29	18	10/31	20	10/29	18	10/30	19	11/01	21	10/20	9	11/13	24	10/23	12	11/02	22
MANG 6 SD3	10/11	10/29	18	10/31	20	10/29	18	10/30	19	11/01	21	10/20	9	11/13	24	10/23	12	11/02	22
MANG 2 SED 1	10/24	11/09	16	11/14	21	11/12	19	11/14	21	11/13	20	10/29	5	11/26	28	11/02	9	11/02	9
MANG 2 SED 2	10/24	11/09	16	11/14	21	11/12	19	11/14	21	11/13	20	10/29	5	11/26	28	11/02	9	11/02	9
MANG 2 SED 3	10/24	11/09	16	11/14	21	11/12	19	11/14	21	11/13	20	10/29	5	11/26	28	11/02	9	11/02	9

Key:

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10 = the number of days from date sampled to date of analysis (or extraction)
[Except: CLP semivolatiles = the number of days from date extracted to date analyzed]

* = analysis (or extraction) was performed outside of contract holding time

NA = not applicable

Table E.5 Hold Time Analysis for Groundwater Samples

Sample I.D.	Date Sampled	Total Metals ICP Analysis	Total Arsenic Analysis	Total Lead Analysis	Total Selenium Analysis	Total Mercury Analysis	CLP Semivolatiles Extraction	CLP Semivolatiles Analysis	GC Volatiles 8010/8020 Analysis	TPH EPA 418.1 Analysis
MANG 4 MW1	10/19	11/13 25	11/15 27	11/13 25	11/15 27	11/01 13	10/23 4	11/16 24	10/30 11	10/31 12
MANG 5 MW1	10/19	11/13 25	11/15 27	11/13 25	11/15 27	11/01 13	10/23 4	11/19 27	10/30 11	10/31 12
MANG 2 MW1	10/19	11/13 25	11/15 27	11/13 25	11/15 27	11/01 13	10/23 4	11/16 24	10/30 11	10/31 12
MANG 3 MW1	10/23	11/13 21	11/15 23	11/13 21	11/15 23	11/01 9	10/26 3	11/20 25	10/30 7	11/13 21
MANG 8 MW1	10/23	11/13 21	11/15 23	11/13 21	11/15 23	11/01 9	10/26 3	11/20 25	10/30 7	11/13 21
MANG 1 MW1	10/23	11/13 21	11/15 23	11/13 21	11/15 23	11/01 9	10/26 3	11/20 25	10/30 7	11/13 21
MANG 6 MW1	10/25	11/13 19	11/15 21	11/13 19	11/15 21	11/01 7	10/29 4	11/09 11	10/30 5	11/02 8
MANG 7 MW1	10/25	11/13 19	11/15 21	11/13 19	11/15 21	11/01 7	10/29 4	11/09 11	10/31 6	11/02 8
MANG 4 MW1-A	10/25	11/13 19	11/15 21	11/13 19	11/15 21	11/01 7	10/29 4	11/09 11	10/30 5	11/02 8
MANG BG MW1	10/25	11/13 19	11/15 21	11/13 19	11/15 21	11/01 7	10/29 4	11/09 11	10/31 6	11/02 8
MANG 0 MW1	10/25	11/13 19	11/15 21	11/13 19	11/15 21	11/01 7	10/30 5	11/13 14	10/30 5	11/02 8

Key:

10/18 = the date the analysis (or extraction) was performed (1990)

10 = the number of days from date sampled to date of analysis (or extraction)

[Except: CLP semivolatiles = the number of days from date extracted to date analyzed]

♦ = analysis (or extraction) was performed outside of contract holding time

NA = not applicable

Table E.6. Hold Time Analysis for Quality Assurance/Quality Control Samples

Sample I.D.		Date Sampled	Total Metals ICP Analysis		Exceptions to ICP Analysis Dates	Total Arsenic Analysis		Total Lead Analysis		Total Selenium Analysis		Total Mercury Analysis		CLP Semivolatiles Extraction		CLP Semivolatiles Analysis		CLP Volatiles Analysis		GC Volatiles 8010/8020 Analysis		TPH EPA 418.1 Analysis	
Rinsate	1	09/19	NA			NA		NA		NA		NA		NA		NA		NA		NA		NA	
Rinsate	2	09/19	10/01	12	Cd – 10/2	10/08	19	10/03	14	10/02	13	09/28	9	09/26	7	09/28	2	10/01	12	NA		10/01	12
Rinsate	3	09/20	NA			NA		NA		NA		NA		NA		NA		NA		NA		NA	
Rinsate	4	09/21	10/01	10	Cd – 10/2	10/08	17	10/03	12	10/03	12	10/10	19	09/26	5	10/01	5	10/03	12	NA		10/01	10
Rinsate	5	09/24	NA			NA		NA		NA		NA		NA		NA		NA		NA		NA	
Rinsate	6	09/25	10/01	6	Cd – 10/2	10/08	13	10/03	8	10/03	8	10/10	15	10/02	7	10/12	10	10/08	13	NA		10/01	6
Rinsate	7	09/26	NA			NA		NA		NA		NA		NA		NA		NA		NA		NA	
Rinsate	8	09/27	10/15	18	Ag – 10/17	10/17	20	10/15	18	10/15	18	10/10	13	10/02	5	10/13	11	10/08	11	NA		10/16	19
Rinsate	9	09/28	(Arrived warm)			NA		NA		NA		NA		NA		NA		NA		NA		NA	
Rinsate	10	09/29	10/15	16	Ag – 10/17	10/17	18	10/15	16	10/15	16	10/10	11	10/02	3	10/13	11	10/11	12	NA		10/16	17
Rinsate	11	10/09	NA			NA		NA		NA		NA		NA		NA		NA		NA		NA	
Rinsate	12	10/10	10/30	20		11/06	27	10/30	20	11/05	26	11/01	22	10/12	2	10/24	12	10/18	8	NA		10/16	6
Rinsate	13	10/11	NA			NA		NA		NA		NA		NA		NA		NA		NA		NA	
Rinsate	14	10/19	11/13	25		11/15	27	11/13	25	11/15	27	11/20	32 *	10/23	4	11/16	24	NA		10/30	11	10/31	12
Rinsate	15	10/23	NA			NA		NA		NA		NA		NA		NA		NA		NA		NA	
Rinsate	16	10/25	11/13	19		11/15	21	11/13	19	11/15	21	11/01	7	10/30	5	11/09	10	NA		10/31	6	11/02	8
Rinsate	17	10/26	NA			NA		NA		NA		NA		NA		NA		NA		NA		NA	
Trip blank		09/19	NA			NA		NA		NA		NA		NA		NA		10/01	12	NA		NA	
Trip blank		09/20	NA			NA		NA		NA		NA		NA		NA		10/02	12	NA		NA	
Trip blank		09/20	NA			NA		NA		NA		NA		NA		NA		10/03	13	NA		NA	
Trip blank		09/21	NA			NA		NA		NA		NA		NA		NA		10/04	13	NA		NA	
Trip blank		09/24	NA			NA		NA		NA		NA		NA		NA		10/08	14	NA		NA	

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[Except: CLP semivolatiles = the number of days from date extracted to date analyzed]
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NA = not applicable

Table E.6, continued

Sample I.D.	Date Sampled	Total Metals ICP Analysis	Exceptions to ICP Analysis Dates	Total Arsenic Analysis	Total Lead Analysis	Total Selenium Analysis	Total Mercury Analysis	CLP Semivolatiles Extraction	CLP Semivolatiles Analysis	CLP Volatiles Analysis	GC Volatiles 8010/8020 Analysis	TPH EPA 418.1 Analysis
Trip blank	09/25	NA		NA	NA	NA	NA	NA	NA	10/08 13	NA	NA
Trip blank	09/26	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA
Trip blank	09/27	NA		NA	NA	NA	NA	NA	NA	10/08 11	NA	NA
Trip blank	09/29	NA		NA	NA	NA	NA	NA	NA	10/11 12	NA	NA
Trip blank	10/01	NA		NA	NA	NA	NA	NA	NA	10/11 10	NA	NA
Trip blank	10/09	NA		NA	NA	NA	NA	NA	NA	10/18 9	NA	NA
Trip blank	10/10	NA		NA	NA	NA	NA	NA	NA	10/16 6	NA	NA
Trip blank	10/11	NA		NA	NA	NA	NA	NA	NA	10/19 8	NA	NA
Trip blank	10/19	NA		NA	NA	NA	NA	NA	NA	NA	10/30 11	NA
Trip blank	10/23	NA		NA	NA	NA	NA	NA	NA	NA	10/30 7	NA
Trip blank	10/25	NA		NA	NA	NA	NA	NA	NA	NA	10/31 6	NA
Trip blank	10/26	NA		NA	NA	NA	NA	NA	NA	NA	10/31 5	NA
Field blank–HP	09/20	10/01 11	Cd – 10/2	10/08 18	10/03 13	10/02 12	09/28 8	NA	NA	10/03 13	NA	10/01 11
Field blank–HP	09/21	NA		NA	NA	NA	NA	09/26 5	10/03 7	NA	NA	NA
Field blank–Pot	09/24	10/01 7	Cd – 10/2	10/08 14	10/03 9	10/03 9	10/10 16	09/26 2	10/01 5	10/08 14	NA	10/01 7
Field blank–DI	09/25	10/01 6	Cd – 10/2	10/08 13	10/03 8	10/03 8	10/10 15	10/02 7	10/12 10	10/08 13	NA	10/01 6
Field blank–HP	10/26	NA		NA	NA	NA	NA	NA	NA	NA	10/31 5	NA
Field blank–Pot	10/26	NA		NA	NA	NA	NA	NA	NA	NA	10/31 5	NA
Field blank–DI	10/26	NA		NA	NA	NA	NA	NA	NA	NA	10/31 5	NA

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NA = not applicable

Table E.7 Hold Time Analysis for Groundwater Sampling, Second Round

Sample I.D.	Date Sampled	Total Metals ICP Analysis	Exceptions to ICP Analysis Dates	Total Arsenic Analysis	Total Lead Analysis	Total Selenium Analysis	Total Mercury Analysis	CLP SEMIVOLATILES Semivolatile Compounds Extraction	CLP SEMIVOLATILES Semivolatile Compounds Analysis	GC Volatiles 8010/8020 Analysis	TPH EPA 418.1 Analysis
MANG BG MW1	02/21	03/05 12	Cd - 3/6	03/05 12	03/05 12	03/06 13	03/08 15	02/25 4	02/27 2	02/26 5	03/06 13
MANG 5 MW1	02/21	03/05 12	Cd - 3/6	03/05 12	03/05 12	03/06 13	03/08 15	02/25 4	02/27 2	02/26 5	03/06 13
MANG 6 MW1	02/21	03/05 12	Cd - 3/6	03/05 12	03/05 12	03/06 13	03/08 15	02/26 5	02/28 2	02/27 6	03/06 13
MANG 7 MW1	02/21	03/05 12	Cd - 3/6	03/05 12	03/05 12	03/06 13	03/08 15	02/25 4	02/27 2	02/27 6	03/06 13
MANG 8 MW1	02/21	03/05 12	Cd - 3/6	03/05 12	03/05 12	03/06 13	03/08 15	02/25 4	02/27 2	02/27 6	03/06 13
MANG 0 MW2	02/21	03/05 12	Cd - 3/6	03/05 12	03/08 15	03/06 13	03/08 15	02/26 5	02/28 2	02/26 5	03/06 13
MANG 1 MW1	02/22	03/05 11	Cd - 3/6	03/06 12	03/05 11	03/07 13	03/08 14	02/25 3	02/28 3	02/28 6	03/06 12
MANG 2 MW1	02/22	03/05 11	Cd - 3/6	03/06 12	03/08 14	03/07 13	03/08 14	02/25 3	02/28 3	02/28 6	03/06 12
MANG 3 MW1	02/22	03/05 11	Cd - 3/6	03/06 12	03/05 11	03/07 13	03/08 14	02/26 4	02/27 1	03/01 7	03/06 12
MANG 4 MW1	02/22	03/05 11	Cd - 3/6	03/06 12	03/05 11	03/07 13	03/08 14	02/26 4	02/28 2	03/01 7	03/06 12
MANG 4 MW1-A	02/22	03/05 11	Cd - 3/6	03/06 12	03/05 11	03/07 13	03/08 14	02/26 4	02/28 2	03/01 7	03/06 12
MANG 0 MW1	02/22	03/05 11	Cd - 3/6	03/05 11	03/05 11	03/07 13	03/08 14	02/25 3	02/27 2	02/28 6	03/06 12
Rinsate 18	02/22	NA		NA	NA	NA	NA	NA	NA	NA	NA
Rinsate 19	02/22	03/05 11	Cd - 3/6	03/05 11	03/05 11	03/07 13	03/08 14	02/25 3	02/27 2	02/28 6	03/06 12
Trip blank	02/21	NA		NA	NA	NA	NA	NA	NA	02/26 5	NA
Trip blank	02/22	NA		NA	NA	NA	NA	NA	NA	02/28 6	NA
Trip blank	02/22	NA		NA	NA	NA	NA	NA	NA	02/28 6	NA
Field blank-HPLC	02/22	03/05 11	Cd - 3/6	03/05 11	03/05 11	03/07 13	03/08 14	02/25 3	02/27 2	02/28 6	03/06 12
Field blank-DI	02/22	03/05 11	Cd - 3/6	03/05 11	03/05 11	03/07 13	03/08 14	02/26 4	02/27 1	02/28 6	03/06 12

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Surrogate Spikes

The surrogate spike analysis was used to determine the efficiency of analyte recovery in sample preparation and analysis using GC and GC/MS[3] methods. The calculated percent recovery of the spike was used as a measure of the analytical method's accuracy. A surrogate spike was prepared by adding to an environmental sample (before extraction) known amounts of pure compounds whose nature was similar to those being analyzed in the sample. The percent recovery was compared with the acceptable percent recovery range for the surrogate as stated in the method and in the QA/QC plan. Corrective action was taken when the surrogate recovery was outside the acceptable range. For volatile organic analyses (VOA), the corrective action was to reanalyze the sample. For the base/neutral/acid-extractable (BNA) analysis, the sample was re-extracted and analyzed only if more than one surrogate from the base/neutral- and/or acid-extractable fraction exceeded the allowable percent recovery or one surrogate had a recovery of less than 10 percent. In either case, the narratives that accompany the sample data describe the corrective action taken.

Matrix Spike/Matrix Spike Duplicate

The matrix spike and matrix spike duplicate analysis was used to determine the accuracy and precision of a method and to judge whether the sample matrix was interfering with the analysis. The percent recovery of a spike was calculated and compared with an acceptable range as specified by each method. If the matrix spike recovery and the matrix spike duplicate recovery exceeded the acceptable range, the problem was diagnosed as sample matrix interference. Precision of the method was assessed by calculating the relative percent difference from the matrix spike pair analysis and comparing the value with an acceptable range established for each method. This technique was used for analyses performed on the GC and GC/MS. A minimum of one matrix spike and one matrix spike duplicate sample were analyzed for every twenty environmental samples or batch of samples analyzed together, whichever was smaller.

Data Validation Summary

The laboratory data were validated in accordance with the criteria specified in HAZWRAP DOE/HWP-65, with the exception of the GC volatile organic analyses. There are no validation criteria for GC volatile organics specified in DOE/HWP-65, so the guidelines specified in DOE/HWP-65/R1 (HAZWRAP, 1990) were used.

GC/MS Volatile Organics

In general, the laboratory data were acceptable. For all analyses, methylene chloride should be reported as "not detected," since in no instance did the sample concentration exceed 10 times the concentration reported in the associated blank.

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[3] GC/MS = gas chromatography/mass spectrometry

In several cases it was necessary to add flags to specific samples:

1. A "J" flag was added to samples MANG-4-SB2 (1), MANG-4-SB2 (3.5), MANG-4-SB3 (3) since the surrogates were outside the QA limits, but greater than 10 percent.
2. Samples MANG-6-SB3 (5.5), MANG-6-SB4 (5), and MANG-8-SB3 (3) were analyzed outside of the contract hold time. A "J" qualifier was added to all associated data to indicate that the hold times were exceeded and that the data should be viewed as estimated. It is believed that these data are usable since the hold times were exceeded by only 2 days or less.

GC Volatile Organics

All laboratory data for GC volatile organics were acceptable.

GC/MS Semivolatile Organics

The laboratory data for the GC/MS semivolatile organics were generally acceptable. In several cases it was necessary to add flags to the data:

1. The detection limits for sample MANG-4-SB5 (1.5) need to be considered estimates since the surrogates were outside QA limits.
2. For samples MANG-4-SB2 (1), MANG-4-SB2 (1D), MANG-4-SB2 (3.5D), MANG-4-SB3 (3), and MANG-4-SB3 (7), di-n-butylphthlate should be reported as not detected. The concentration in the samples was less than 10 times the concentration in the associated blank.
3. For samples MANG-6-SB5 (3.5) and MANG-6-SB6 (3.5), di-n-butylphthalate should be reported as not detected. The concentration in the samples is less than 10 times the concentration in the associated blank.
4. For sample MANG-8-SB1 (1.5), di-n-butylphthalate should be reported as not detected. The concentration in the sample is less than 10 times the concentration in the associated blank.
5. The detection limits for sample MANG-8-SB6 (1.5) should be considered estimates since the surrogates were outside QA limits.
6. The detection limits for sample MANG-6-MW-1 (second round) should be considered estimates since the surrogates were outside QA limits.

Metals

The laboratory data for metals were generally acceptable. In several cases it was necessary to add flags to the data:

1. For rinsate 4, a "J" flag was added to the reported value for lead. The concentration in the sample was less than 10 times the concentration in the preparation blank. The value should be considered an estimate.
2. For the potable water and DI water field blanks, a "J" qualifier should be added to the reported value for lead. The concentration in the samples was

less than 10 times the concentration in the preparation blank. The values should be considered estimated.

3. For rinsates 8 and 10, a "J" qualifier should be added to the reported value for lead. The concentration in the samples was less than 10 times the concentration in the preparation blank. The values should be considered estimated.

4. For rinsate 12, a "J" qualifier should be added to the reported values for cadmium, copper and lead. The concentrations in the sample were less than 10 times the concentrations in the preparation blanks. The values should be considered estimated.

5. For samples MANG-4-MW1, MANG-5-MW1, MANG-2-MW1, MANG-1-MW1, MANG-3-MW1, MANG-8-MW1, MANG-6-MW1, MANG-7-MW1, MANG-4-MW1A, MANG-BG-MW1, MANG-0-MW1, rinsate 14 and rinsate 16, a "J" qualifier should be added to the reported values for lead. The concentration in the samples was less than 10 times the concentration in the preparation blanks. The values should be considered estimated.

6. For all samples collected in the second round of groundwater sampling, a "J" qualifier should be added to the reported values for lead. The concentration in the samples was less than 10 times the concentration in the preparation blanks. The values should be considered estimates.

Total Petroleum Hydrocarbons

All total petroleum hydrocarbon (TPH) data were acceptable.

Field Quality Control Samples

Rinsate Samples

Equipment rinsates were collected from sampling equipment during soil, groundwater, and sediment sampling activities. Rinsate samples were collected every day and analyzed only every other day. Because of the short duration of the groundwater sampling program, all the samples were collected before the results of the analyses from the groundwater equipment rinsate samples were complete. No constituents necessitating corrective action or the daily analysis of the rinsates were detected. Table E.8 is a summary of the constituents detected in the equipment rinsates.

Results of analyses performed on samples and rinsates collected on the same day were compared. According to the HAZWRAP QA/QC requirements, if the concentration of an analyte detected in the samples was less than 5 times the concentration detected in the corresponding equipment rinsate, the sample analyte concentration was flagged as estimated ("J" qualifier). If the data were already flagged with an "estimate" qualifier (from the laboratory or field blanks), no other qualifier was added as a result of the rinsate analysis. The only flag added was a "J" for sample MANG-6-SB14 (5.5) for acetone.

Table E.8 Chemical Constituents Detected in Equipment Rinsates

Constituent	Concentration								
	Rinsate 2	Rinsate 4	Rinsate 6	Rinsate 8	Rinsate 10	Rinsate 12	Rinsate 14	Rinsate 16	Rinsate 19
CLP VOA (µg/L):									
Chloroform	14	10 J	9	12	10	10	NA	NA	NA
Bromodichloromethane	4 J	ND	ND	3 J	3 J	ND	NA	NA	NA
Acetone	ND	ND	ND	ND	ND	19 J	NA	NA	NA
GC VOA (8010/8020) (µg/L):									
Chloroform	NA	NA	NA	NA	NA	NA	22.0	15.0	7.6
Bromodichloromethane	NA	NA	NA	NA	NA	NA	4.4	1.8	ND
CLP semivolatiles (µg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metals (µg/L):									
Barium	ND	ND	ND	ND	ND	ND	ND	5.0 B	ND
Copper	ND	ND	ND	ND	ND	12.0 B	ND	14.0 B	ND
Lead	5.3	5.5 J	30.6	1.5 B J	2.5 B J	4.7 J	3.8 J	4.8 J	1.8 BNJ
Zinc	7.0 B	7.0 B	16.0 B	14.0 B	21.0	163	20.0*	131*	8.1 B
Total petroleum hydrocarbons (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = not detected
NA = not applicable

Data qualifiers:

J The value reported is an estimated concentration. This is used when the compound is detected at an amount below the reporting limit.

Metals:

B Reported value is less than reporting limit but greater than the instrument detection limit.
N Spiked sample recovery not within control limits.
* Duplicate analysis not within control limits.

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Field Blanks

Several of the equipment rinsate samples contained trace concentrations of organic compounds (chloroform and bromodichloromethane). One source of these compounds is the water used for the final rinse. According to the work plan, this water was to be sampled and analyzed for all the parameters in the analytical program during each sampling event. This was considered a two event project. The first sampling event included the soil gas survey, soil boring samples, and the first round of groundwater sampling. The second event was the second round of groundwater sampling. This water sample was called a field blank.

Three sources of water were used during the sampling program. One source was high-performance liquid chromatography (HPLC) grade water. The other sources were distilled water purchased in gallon bottles from local stores and potable water. All water types were sampled and analyzed for the parameters in the sampling program. The results of these analyses are in Table E.9. As shown, small concentrations of chloroform, dichloromethane, and bromodichloromethane were detected in the field blank samples. These compounds are often found in domestic water sources. It appears that the method of preparation used by the vendor of the HPLC water was not removing the trace organic contamination.

Samples of well construction materials such as the PVC casing and the sand pack were collected and archived. Material certifications were received with each well construction material.

All sample analyses were compared with the results for the field blank. In accordance with the HAZWRAP QA/QC manual, if the concentration of an analyte detected in the samples was less than 5 times the concentration detected in the field blank, the sample analyte concentration was flagged as estimated ("J" qualifier). If the data were already flagged with an "estimate" qualifier (from the laboratory), no other qualifier was added as a result of the field blank analysis. The qualifiers added as a result of this analysis were:

- A "J" was added to sample MANG-1-MW1 (fall) for chloroform
- A "J" was added to samples MANG-6-MW1-D (fall), MANG-7-MW1 (fall) and MANG-BG-MW1 (fall) for arsenic
- A "J" was added to all the fall monitor well sample results (first round samples) except MANG-4-MW1A for barium
- A "J" was added to sample MANG-6-MW1 (fall) for copper
- A "J" was added to sample MANG-1-MW1 (fall) for zinc
- A "J" was added to all the spring monitor well sample results (second round samples) for lead
- A "J" was added to all the spring monitor well sample results (second round sampling, except for MANG-1-MW1 and MANG-6-MW) for zinc
- A "J" was added to sample MANG-8-MW1 (spring) for chloroform.

Table E.9 Summary of Chemical Constituents Detected in Field Blanks

Analysis	Constituent	Concentration HPLC Water	Concentration Deionized Water	Concentration Potable Water
CLP volatiles (μg/L)				
	Chloroform	20	ND	13
	Bromodichloromethane	5	ND	8
GC volatiles (8010/8020) (μg/L):				
	Chloroform	23.0 (7.1)*	ND (ND)	5.0
	Bromodichloromethane	4.2 (ND)	ND (ND)	4.1
	Dichloromethane	ND (5.0)	ND (ND)	ND
CLP semivolatles (μg/L)		ND (ND)	ND (ND)	ND
Metals (mg/L):				
	Arsenic	ND (ND)	ND (ND)	8.8 B
	Barium	ND (ND)	ND (ND)	50.0 B
	Copper	ND (ND)	ND (ND)	25.0
	Lead	5.3 (1.7) BN	4.3 (1.5) BN	8.3 W
	Zinc	7.0 B (6.5) B	ND (14.5) B	75.0
Total petroleum hydrocarbons (mg/L)		ND (ND)	ND (ND)	ND

* Values in parentheses refer to the second round of groundwater sampling, February 21-22, 1991. Only HPLC and deionized water were used for the second round of groundwater sampling.

ND = not detected.

Data qualifiers:

B Reported value is less than reporting limit but greater than the instrument detection limit.

N Spiked sample recovery not within control limits.

W Postdigestion spike for furnace AA analysis out of central limits (85-115%), while sample absorbance is less than 50% of spike absorbance.

Trip Blanks

Trip blanks were prepared by the laboratory and shipped to field personnel for use during the sampling. A trip blank accompanied each shipment of samples requiring volatile organic analysis from the time of collection in the field through analysis in the laboratory. The trip blank was analyzed by the same method as the accompanying samples, GC/MS for soils and sediment, and GC for groundwater. The trip blank on September 26, 1990, was broken in transit, so the accompanying rinsate 7 was used as a replacement. No constituents were found in any trip blank sample at concentrations above detection limits.

Field Duplicate Samples

Field duplicates were collected to assess the representativeness of sample collection. Duplicate analytical results were compared, and a relative percent difference (RPD) was calculated for analytes that were detected. If an analyte was detected at less than the CRDL[4] but greater than the IDL[5] in either the sample or the duplicate, the RPD was not calculated. If an analyte was detected in a sample but not in the duplicate sample, the RPD was not calculated. The results of this analysis for metals, organics, and TPH for the soil duplicates are presented in Tables E.10 through E.12, respectively. Tables E.13 through E.15 contain the results of the duplicate analyses for metals and organics performed on groundwater duplicates. Table E.16 lists the results of the duplicate analysis for sediment samples.

According to the work plan, field duplicates should constitute 10 percent of the environmental samples collected for each sample matrix. For soil, sample duplicates were collected by placing a duplicate boring adjacent to the original boring. The sleeves from the duplicate boring corresponding to the sleeves from the original were sent to the laboratory. Each duplicate boring was given a distinct sample ID. A total of fifty-eight borings were collected, with six duplicates, for a total of 10.3 percent. There were six sediment samples collected, with one duplicate, for a total of 16.7 percent. The total number of soil matrix samples (soil and sediment) sent to the laboratory was eighty-eight, with a total of eight duplicate samples. This is a total of 9.1 percent.

This number is slightly lower than 10 percent because it was not possible to know before sampling how many samples would be sent to the lab from each boring. If it had been possible to send two samples from more of the duplicate borings, the total number of duplicates would have been greater than 10 percent. Since each boring was considered a discrete sample for the purpose of calculating duplicates, the QA/QC objective for representativeness was met.

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[4] CRDL = contract-required detection limit

[5] IDL = instrument detection limit

Table E.10 Duplicate Analysis on Soil Samples - Metals

Sample ID	Metal	Concentration (mg/kg)	Duplicate Concentration (mg/kg)	Mean Concentration (mg/kg)	Relative Percent Difference (RPD) (%)
MANG-1-SB4(1.5)	Arsenic	8.4	8.4	8.4	0
	Barium	252 N	763 N	508	101
	Chromium	17.7*	5.9*	11.8	100
	Copper	15.8	13.4	14.6	16
	Lead	16.6 N*S	11.4 N*S	14.0	37
	Nickel	17.7	ND	NA	NA
	Selenium	ND	0.38 BW	NA	NA
	Zinc	51.9	23.5	37.7	75
MANG-3-SB9(1.5)	Arsenic	7.2	7.9	7.6	9
	Barium	176	274	225	44
	Chromium	15.5	13.8	14.7	12
	Copper	17.6*	17.2*	17.4	2
	Lead	9.0	8.9	9.0	1
	Nickel	9.5	15.7	12.6	49
	Zinc	46.4*	60.2*	48.3	26
MANG-3-SB3A(1.0)	Arsenic	5.4	23.4	14.4	125
	Barium	44.7	55.7	50.2	22
	Chromium	6.2*	7.3*	6.8	16
	Copper	3.9 B	21.4	NA	NA
	Lead	3.7 B	5.2 B	NA	NA
	Selenium	ND	0.32 B	NA	NA
	Zinc	24.8	33.8	29.3	31
MANG-4-SB2(1)	Arsenic	7.4	5.0	6.2	39
	Barium	219	170	195	25
	Chromium	17.0	9.3	13.2	59
	Copper	15.1*	7.4*	11.3	68
	Lead	16.7	9.3	13.0	57
	Nickel	13.8*	ND	NA	NA
	Zinc	48.4	34.3	41.4	34
MANG-4-SB2(3.5)	Arsenic	3.8	5.3	4.6	33
	Barium	165	214	190	26
	Chromium	6.4	11.6	9.0	58
	Copper	11.8*	10.1	11.0	16
	Lead	8.7	7.6 N	8.2	13
	Nickel	7.5 B*	8.4	NA	NA
	Zinc	36.0	36.5	36.3	1

Table E.10, continued

Sample ID	Metal	Concentration (mg/kg)	Duplicate Concentration (mg/kg)	Mean Concentration (mg/kg)	Relative Percent Difference (RPD) (%)
MANG-6-SB7(1.0)	Arsenic	5.9	4.5	5.2	27
	Barium	267	132	200	68
	Chromium	12.9*	14.4*	13.7	11
	Copper	43.4	15.2	29.3	96
	Lead	9.5	9.6	9.6	1
	Nickel	ND	12.4	NA	NA
	Zinc	60.8	43.1	52.0	34
MANG-8-SB1(1.5)	Arsenic	6.3	7.3	6.8	15
	Barium	182	187	185	3
	Chromium	9.4	14.6	12.0	43
	Copper	12.6	14.2	13.4	12
	Lead	11.4 N	12.9 N	12.2	12
	Nickel	7.5 B	7.6 B	NA	NA
	Zinc	39.2*	45.4*	42.3	15

ND = not detected

NA = not applicable

$$RPD = \left| \frac{\text{Concentration sample - Concentration duplicate}}{\text{(Concentration sample + Concentration duplicate)/2}} \right| \times 100\%$$

Data qualifiers:

- B Reported value is less than reporting limit but greater than the IDL.
- N Spiked sample recovery not within control limits.
- S Reported value was determined by the method of standard additions.
- * Duplicate analysis not within control limits.
- W Postdigestion spike for furnace AA analysis out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance.

Table E.11 Duplicate Analysis on Soil Samples - Organics

Sample ID	Organic	Concentration ($\mu g/kg$)	Duplicate Concentration ($\mu g/kg$)	Mean Concentration ($\mu g/kg$)	Relative Percent Difference RPD (%)
MANG-1-SB4(1.5)	Diethylphthalate	ND	150 J	NA	NA
MANG-3-SB9(1.5)	Acetone	70 J	250 J	NA	NA
	Diethylphthalate	590	110 J	NA	NA
	Butylbenzylphthalate	200 J	ND	NA	NA
MANG-3-SB3A(1.0)			ND	ND	
MANG-4-SB2(1)			ND	ND	
MANG-4-SB2(3.5)			ND	ND	
MANG-6-SB7(1.0)			ND	ND	
MANG-8-SB1(1.5)	Acetone	95 J	56 J	NA	NA
	trans-1,2-Dichloroethane	ND	8	NA	NA
	Toluene	29	46	38	45
	Ethyl benzene	ND	8	NA	NA
	m/p-Xylene	11	14	13	24
	o-Xylene	10	9	10	11

ND = not detected

NA = not applicable

$$RPD = \left| \frac{\text{Concentration sample - Concentration duplicate}}{\text{(Concentration sample + Concentration duplicate)/2}} \right| \times 100\%$$

Data qualifiers:

J The value reported is an estimated concentration. This is used when the compound is detected at an amount below the reporting limit.

Table E.12 Duplicate Analysis on Soil Samples - Total Petroleum Hydrocarbons

Sample ID	Concentration (mg/kg)	Duplicate Concentration (mg/kg)	Mean Concentration (mg/kg)	Relative Percent Difference (RPD) (%)
MANG-1-SB4(1.5)	ND	ND	NA	NA
MANG-3-SB9(1.5)	ND	ND	NA	NA
MANG-3-SB3A(1.0)	ND	ND	NA	NA
MANG-4-SB2(1)	86	1500	793	178
MANG-4-SB2(3.5)	600	230	415	89
MANG-6-SB7(1.0)	310	ND	NA	NA
MANG-8-SB1(1.5)	140	22	81	146

ND = not detected

NA = not applicable

$$RPD = \left| \frac{\text{Concentration sample - Concentration duplicate}}{\text{(Concentration sample + Concentration duplicate)/2}} \right| \times 100\%$$

Table E.13 Groundwater Duplicate Analysis, MANG – First Round Sampling
Sample ID: MANG-6-MW1
Duplicate ID: MANG-0-MW1

Analysis	Constituent	Sample Concentration	Duplicate Concentration	Mean Concentration	Relative Percent Difference (RPD) (%)
Volatile organics (μg/L):					
	Benzene	1.8	1.8	1.8	0
Semivolatile organics (μg/L):					
	Bis(2-ethylhexyl)phthalate	6 J	21	NA	NA
Metals (μg/L):					
	Arsenic	ND	1.5 B	NA	NA
	Barium	212	215	214	1
	Copper	6.0 B	ND	NA	NA
	Lead	6.3 J	3.8 J	5.1	50
	Mercury	0.19 B	ND	NA	NA
	Zinc	52.0*	15.0 B*	NA	NA
Total petroleum hydrocarbons (mg/L)		ND	ND	NA	NA

ND = not detected

NA = not applicable

$$\text{RPD} = \left| \frac{\text{Concentration sample - Concentration duplicate}}{(\text{Concentration sample + Concentration duplicate})/2} \right| \times 100\%$$

Data qualifiers:

B Reported value is less than reporting limit but greater than the IDL.

J The value reported is an estimated concentration. This is used when the compound is detected at less than 10 times the amount in an associated preparation blank or less than 5 times the amount in an associated field blank.

* Duplicate analysis not within control limits.

Table E.14 Groundwater Duplicate Analysis, MANG – Second Round Sampling
Sample ID: MANG-6-MW1
Duplicate ID: MANG-0-MW2

Analysis	Constituent	Sample Concentration	Duplicate Concentration	Mean Concentration	Relative Percent Difference (RPD) (%)
Volatile organics (μg/L):					
	Benzene	6.8	5.9	6.35	14
	Ethyl benzene	3.3	3.4	3.35	3
Semivolatile organics (μg/L):		ND	ND	NA	NA
Metals (μg/L):					
	Barium	248	250	249	0.4
	Cadmium	2.7 B	ND	NA	NA
	Lead	4.2 NJ	4.2 NJ	4.2	0
	Zinc	9.4 B	ND	NA	NA
Total petroleum hydrocarbons (mg/L)		ND	ND	NA	NA

ND = not detected

NA = not applicable

$$\text{RPD} = \left| \frac{\text{Concentration sample - Concentration duplicate}}{(\text{Concentration sample + Concentration duplicate})/2} \right| \times 100\%$$

Data qualifiers:

- B Reported value is less than reporting limit but greater than the IDL.
- J The value reported is an estimated concentration. This is used when the compound is detected at less than 10 times the amount in an associated preparation blank or less than 5 times the amount in an associated field blank.
- N Spiked sample recovery not within control limits.

Table E.15 Groundwater Duplicate Analysis, MANG – 2nd Round Sampling
Sample ID: MANG-2-MW1
Duplicate ID: MANG-0-MW1

Analysis	Constituent	Sample Concentration	Duplicate Concentration	Mean Concentration	Relative Percent Difference (RPD) (%)
Volatile organics (μg/L)		ND	ND	NA	NA
Semivolatile organics (μg/L):					
	Bis(2-ethylhexyl)phthalate	13 J	4 J	NA	NA
Metals (μg/L):					
	Arsenic	ND	2.5 BW	NA	NA
	Barium	57.8 B	57.8 B	NA	NA
	Copper	ND	4.7 B	NA	NA
	Lead	4.2 NJ	3.7 NJ	3.95	13
	Selenium	9.7	10.1	9.9	4
	Zinc	15.0 B	12.8 B	NA	NA
Total petroleum hydrocarbons (mg/L)		ND	ND	NA	NA

ND = not detected

NA = not applicable

$$RPD = \left| \frac{\text{Concentration sample - Concentration duplicate}}{(\text{Concentration sample + Concentration duplicate})/2} \right| \times 100\%$$

Data qualifiers:

Organics:

J The value reported is an estimated concentration. This is used when the compound is detected at an amount less than the reporting limit.

Metals:

B Reported value is less than reporting limit but greater than the IDL.

J The value reported is an estimated concentration. This is used when the compound is detected at less than 10 times the amount in an associated preparation blank or less than 5 times the amount in an associated field blank.

N Spiked sample recovery not within control limits.

Table E.16 Sediment Duplicate Analysis, MANG
Sample ID MANG-6-SD2
Duplicate ID MANG-6-SD0

Analysis	Constituent	Concentration	Duplicate Concentration	Mean Concentration	Relative Percent Difference (RPD) (%)
Volatile organics (μg/kg)		ND	ND	NA	NA
Semivolatile organics (μg/kg)		ND	ND	NA	NA
Metals (mg/kg):					
	Arsenic	4.9	5.9 S	5.4	19
	Barium	269	344	307	24
	Cadmium	6.4	6.0	6.2	6
	Chromium	57.1*	53.4*	55.3	7
	Copper	34.8	42.3	38.6	19
	Lead	529	211	370	86
	Mercury	0.061 B	0.065 B	NA	NA
	Nickel	15.6	16.7	16.2	NA
	Zinc	284	251	268	12
Total petroleum hydrocarbons (mg/kg)		3,000	2,600	2,800	14

ND = not detected

NA = not applicable

$$RPD = \left| \frac{\text{Concentration sample - Concentration duplicate}}{(\text{Concentration sample + Concentration duplicate})/2} \right| \times 100\%$$

Data qualifiers:

B Reported value is less than reporting limit but greater than the IDL.

* Duplicate analysis not within control limits.

S Reported value was determined by the method of standard additions.

For groundwater, there were twenty samples and three duplicates collected for a total of 15 percent. The QA/QC objective for representativeness was met. For the total investigation, there were 108 samples collected and 11 duplicates for a total of 10.2 percent.

An RPD of less than 50 percent is considered adequate for field duplicates, particularly for soils that tend to be heterogeneous and difficult to duplicate. A review of the soil and sediment duplicate tables show that less than 25 percent of the duplicate analyses exceeded this RPD goal. For groundwater, none of the nine analytes for which RPDs were calculated exceeded 50 percent. This indicates that sampling techniques were consistent and uniform and that sample representativeness was maintained. No additional qualifiers were attached to the sample data if the RPD exceeded 50 percent.

ASSESSMENT OF THE QA OBJECTIVE

Completeness

Completeness of the sample analyses was determined in two ways. The first manner is comparing the number of sample locations (borings, well, etc.) with those planned. At least one sample was collected from all but one location, for a total of 98.7 percent. The other manner is to compare the number of laboratory analyses requested from the number actually run which were considered valid. This total was 99.4 percent. The QA objective for completeness is 95 percent, as specified by the project QA/QC plan. Invalid data or analyses never run are viewed as incomplete data. Completeness is assessed for the entire analytical sampling program, rather than for the soil and groundwater sampling phases separately.

The completeness values calculated exceed the QA objective of 95 percent.

Representativeness

The samples' representativeness was ensured by using the sampling protocol specified in the work plan, decontaminating equipment between samples, and collecting the appropriate QC field samples. HAZWRAP field audits indicated that the procedures specified in the work plan were followed.

Field QC samples collected continuously throughout the sampling program indicated no corrective action was necessary to ensure sample representativeness. Also, the field duplicate analyses generally reflected that the sampling technique was consistent and the samples were representative.

Precision

The objective for precision is to equal or exceed the precision demonstrated for the applied analytical methods on similar samples. Precision is evaluated most directly by recording and comparing multiple measurements of the same parameter on the same exact sample under the same conditions. It is expressed in terms of relative percent difference (RPD).

Acceptable levels of precision will vary according to the sample matrix, the specific analytical method, and the analytical concentration relative to the method detection limit.

CLP Criteria

Criteria for relative percent difference are published by the EPA as part of the contract laboratory program. For organic parameters (volatile and semivolatile analyses by GC/MS), CLP methods require that the RPD criteria be evaluated on samples spiked in duplicate with specified compounds. The spiking compounds used and the advisory limits for recovery and RPDs are listed on Table E.17.

Non-CLP Criteria

All metals analyses, volatile analyses (by GC methods), and total petroleum hydrocarbon (TPH) analyses were performed by non-CLP methods. For TPH analyses, samples were spiked in duplicate by a nonvolatile mineral oil. Because no established RPD criteria exist for TPH, an advisory limit of ±20 percent was used. For GC analysis, the acceptance criterion for precision was specified by the method. The acceptance criterion for metals analyses is ±20 percent.

Accuracy

A measurement's degree of accuracy is based on a comparison of the measured value with an accepted reference or true value. Accuracy of an analytical procedure is best determined by analyzing a sample and its corresponding matrix spike sample. Accuracy is expressed as percentage recovery (PR).

Similar to precision, the degree of accuracy and the recovery of analyte to be expected for analysis of QC samples and spiked samples is dependent on the matrix, method of analysis, and compound or element being analyzed. The concentration of the analyte relative to the detection limit is also a factor in determining the accuracy of the measurement.

CLP Criteria

Percent recovery criteria, published by the EPA as part of the CLP, are used to evaluate accuracy as recovery of matrix spike duplicates (in organics analyses).

For each analysis performed by GC/MS, selected compounds are spiked into duplicate aliquots of the same sample, and the recovery of each is calculated. The advisory CLP limits are listed in Table E.17. In addition, for each method, EPA has selected appropriate surrogate compounds. The CLP limits for surrogate recoveries are listed in Table E.18.

Non-CLP Criteria

Non-CLP analyses that will be performed in the laboratory are GC analyses of volatile compounds (in water samples), TPH, and metals. For GC analyses, the percent recovery is specified by the method. Metals analyses will achieve a percent recovery of 75 to 125 percent. There is no EPA-established percent recovery range

Table E.17 Control Limits for Matrix Spike/Matrix Spike Duplicate

Matrix Spike Compound	Water*		Soil	
	%Recovery	RPD %	%Recovery	RPD %
Volatile organics:				
1,1-Dichloroethene	61-145	14	59-172	22
Trichloroethene	71-120	14	62-137	24
Chlorobenzene	75-130	13	60-133	21
Toluene	76-125	13	59-139	21
Benzene	76-127	11	66-142	21
Semivolatile organics:				
1,2,4-Trichlorobenzene	39-98	28	38-107	23
Acenaphthene	46-118	31	31-137	19
2,4-Dinitrotoluene	24-96	38	28-98	47
Pyrene	26-127	31	35-142	36
N-Nitroso-di-n-propylamine	41-116	38	41-126	38
1,4-Dichlorobenzene	36-97	28	28-104	27
Pentachlorophenol	9-103	50	17-109	47
Phenol	12-89	42	26-90	35
2-Chlorophenol	27-123	40	25-102	50
4-Chloro-3-methylphenol	23-97	42	26-103	33
4-Nitrophenol	10-80	50	11-114	50

* These limits are for advisory purposes only.

Table E.18 Surrogate Spike Control Limits
for GC/MS Organic Analyses

Surrogate Compound	Soil/Sediment %Recovery	Water %Recover
Volatile organics:		
1,2-Dichloroethane-d4	70-121	76-114
4-Bromofluorobenzene	74-121	86-115
Toluene -d8	81-117	88-110
Semivolatile organics:		
Nitrobenzene	23-120	35-114
Terphenyl-d14	18-137	33-141
2-Fluorobiphenyl	30-115	43-116
2-Fluorophenol	25-121	21-100
2,4,6-Tribromophenol	19-122	10-123
Phenol-d5	24-113	10-94

for TPH, so an advisory limit of 75 to 125 percent will be used. If the laboratory is using historical data and a control chart, then the limits of the control chart will govern.

Generally, these objectives were met for the samples analyzed. There is currently no qualifier used to flag data when the accuracy objective is not attained. For a more detailed discussion of accuracy attained from the laboratory spike analyses, refer to the laboratory case narratives.

CONCLUSIONS

It was necessary to flag only the sediment VOA analyses data with an "R" qualifier. All other data generated during this sampling program are assessed to be representative and valid and should be considered acceptable.